Published
the 18th of each month by
PRACTICAL PUBLICATIONS
Incorporated
1142 N. Meridian St.
Indianapolis 4, Ind.
Telephone Riley 6771

Industrial FINISHING

W. H. ROHR, Editor P. C. BARDIN, Associate Editor

Contents

DECEMBER, 1947
Vol. XXIV, No. 2

★

Distributed monthly to finishing room and paint shop foremen, production superintendents, chemists, purchasing agents and company executives of metal-working, woodworking and miscellaneous industrial plants where production cleaning and finishing are major operations in parts and products manufacture.

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Subscription Rates Per Year
U. S. and Possessions.....$2.00
Canada and Foreign Countries.....$4.00
(No subscription solicitors are employed)

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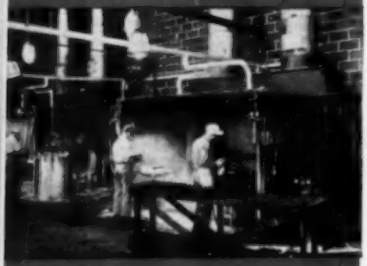
24 TWENTY-FOURTH YEAR OF PUBLICATION

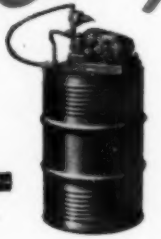
Material Control Paint Circulating System

Water Wash Booths Under Pressure Spraying Conbelts.



Universal Divided Water Wash Booths for Spraying Small Parts

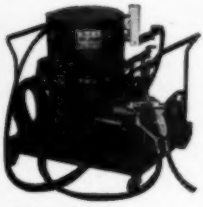
A Complete



Barrel Circulating Pumps

Air Cleaning Guns

Pressure Feed Paint Tanks



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Air and Material Regulators

Standard Bench Type Dry Spray Booths

Standard Floor and Bench Type Turn Tables

Portable and Stationary Air Compressor Outfits

M & E offers a complete finishing service for every finishing problem, a full standard line and special equipment designed to meet individual needs . . . all backed up by many years experience in serving the finishing industry. Hundreds of satisfied customers

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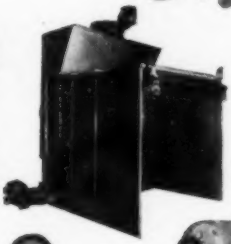
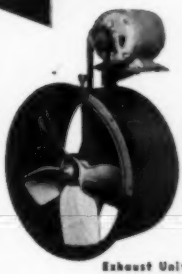
Service...

Water Wash Spray Booths



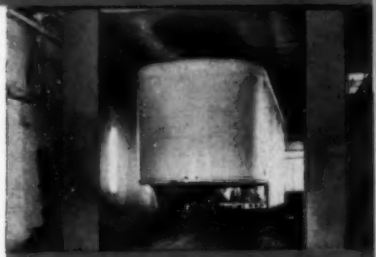
Oil and Water Extractors



Exhaust Units for Spray Booths and Hazardous Locations

Air, Material Hose and Hose Connections

Standard Floor Type Dry Spray Booths



Large Water Wash Booth For Spraying Bus and Semi-Trailer Bodies.

Roller Conveyor Type Water Wash Booth For Heavy Machine Tool Parts Painting.

High Type Water Wash Booth For Refrigerator Parts Painting.

using many thousands of dollars worth of M & E equipment testify to the dependability of M & E facilities and service. A complete engineering service is available and M & E sales engineers are always eager to serve you. Prompt shipment on most standard items —quick delivery on special equipment. *Write for industrial catalog.*

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ENGINEERS AND DESIGNERS

To Buy or Not to Buy. "Don't buy anything you can't use, but if you or your customers can use something —buy it now because it is cheaper today than it will be next month. Prices are going up.

"We have not reached a postwar let-down in inflation, because we still are at war in what frequently has been called 'The Cold War'. Only now our weapons are wheat, grain, steel and trucks."

These statements were made by James S. Knowlson, president and chairman of the board of Stewart-Warner Corp., before a recent large convention of distributors and their representatives from all sections of the country.

* * *

Tung Oil Varnishes. The American paint industry is now expanding its production of oleo-resinous varnishes and vehicles for use in surface coatings, according to a reputable source. This trend is due largely to the availability of tung oil (China wood oil) after a lapse of many years, at a current price much lower than either linseed or dehydrated castor oil—the only two oils now on the market which can be favorably compared with tung oil.

Despite the fact that tung oil has been available for many months—frequently at attractive price levels as compared to other oils—the paint industry has been slow in returning to any major use of this material. There are many reasons for this . . .

The fact that phthalic anhydride and, therefore, alkyd resins promise to continue on the scarce list for many months to come, is an additional factor accelerating the return to hard resin tung-oil varnish formulations. During the scarcity of alkyd resins and tung oil, it was necessary to use linseed or dehydrated castor as the best oils for the production of varnishes or paint vehicles.—U. S. I. Chemical News.

* * *

Plastic Signboards. An industry-wide trend toward plastics in the outdoor sign field may be indicated by the recent development of a plastic sign after two years work by four large companies. Its designers, by taking advantage of certain properties of the plastic, Lucite, have produced a sign that is strikingly different from signs made of conventional materials. It already is in commercial production.

In the new sign, by reason of the ability of "Lucite" to "pipe" light, the sun's rays are diffused over both sides. At night, both surfaces of the sign are illuminated by diffusion of light from two cold cathods tubes mounted inside. The whole sign glows evenly.—DuPont News.

* * *

Golden Jubliee. There is some talk of celebrating 50 years of progress in New York in 1948. It is expected to be a little Worlds Fair, to be held from April through October, to show the progress in industry, business, the arts and science since 1898. Tentative

(Continued on page 14)

Kellogg-American

MICRO-SPRAY

TRADE-MARK

Gentlemen: IF-2

Please send me complete information on the NEW Kellogg-American MICRO-SPRAY Gun.

NAME _____

FIRM _____

STREET _____

CITY _____ STATE _____

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EFFICIENT
WATER CURTAIN
SPRAY BOOTH
OPERATION

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BY
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PLUGGED NOZZLES • WATER BREAKS
SCALE CLOGGED LINES
SLUDGE IN RESERVOIR
LOSS OF PRESSURE

• • •
FOR DETAILS WRITE

The Du Bois Company
CINCINNATI 3 OHIO

DETROIT
Handy **'TAC' RAGS**
TRADE MARK REG.
Successfully used by Leading Industrial Plants for over 11 Years

For the cost of a few cents — Absolute Assurance of a perfect Mirror-Like Finish through removal of all DUST, LINT, and SANDING PARTICLES before Painting.

Economical Durable
Never Dry Out or Stiffen
Remain Soft and Tacky Indefinitely
Always Ready for Instant Use
Spontaneous Combustion-Proof

If your Local Paint Dealer cannot supply you, write to Manufacturer.

DETRO SALES CO.
414 North San Pedro Street
Los Angeles 12, Calif.

plans locate the show around Grand Central Palace with exhibits too large for the Palace grouped along the Park Avenue Mall. Visitors will view these from an elevated moving platform.

* * *

A New Electric Eye has been developed, capable of "seeing" up to 1000-ft. This is about four times as far as those now in use. It is said that the new eye is not affected by outside light, rain or snow. Industry will find plenty of use for the improved eye when it is available.

* * *

Reinforced Plywood. Under a patent assigned to Owens-Corning Fiberglass Corp., plywood will be made with alternate layers of glass fibers . . . to provide sufficient reinforcement so that laminated wood may be used in lieu of metal. The glass fibers are of the continuous type making their use possible in moulded plywood. It is also possible to use glass fibers as an outside veneer to provide protection against fire, normal wear or severe abrasion.

Synthetic adhesives have made it possible to successfully bond different types of material such as metal and wood, leather and glass, plastics and wood, and metal and glass. With this new discovery in reinforcement, laminates are truly coming into their own.

* * *

Greater Productivity by employes can hardly be expected through education, without first ascertaining their attitude toward the company. So said James C. Worthy of the personnel department of Sears Roebuck & Co. Find out where employe complaints are centered, through a comprehensive survey; then start corrective measures to eliminate justified complaints. It is of little use to try to educate an employe whose attitude is one of dislike or distrust.

This appears to be a sensible ap-

preach and worthy of trial in any industrial plant.

* * *

Factory Open House. "There is no use in hiding your light under a bushel", seems to be a policy increasing in popularity among several large manufacturers. A widely advertised open house for several days invites employes' families to see where Dad works. Also the clergy, educators and John Q. are given an opportuity to see how automobiles, jet engines and all sorts of things are made.

The latest "See For Yourself" tours are announced by American Type Founders, Inc., which also includes the plants of associated companies.

Such a policy is educational and a builder of goodwill. Another thing: It sounds the knell on the so-called hush-hush industries who think they have highly secret methods. The average industrial plant has no secrets except future developments that are still on the engineering drawing boards. When these are ready for the market they become public knowledge.

* * *

Christmas Toys this year will emphasize peace—at an increase in price of at least 10%, according to The American Toy Institute, as reported by United Press. Plastics, steel and rubber—banned during the war—are used to make bigger and better playthings for junior. They run all the way from dolls and toy washing machines to prefab houses, conveyor belts, atomic pistols and jet-propelled airplanes. Looks as if it might be a good Christmas, even if it costs more.

* * *

Inventories; Uncertainty. Inventories—the materials, parts and supplies you have on hand to use—are a present as well as a future problem. For months management has been preaching, "Watch your inventories. This volume of business can't last". On the

(Continued on page 68)

Spray on . . .
FILMITE
Peel off
OVERSPRAY
A non-drying film that prevents overspray from sticking to dry areas of paint spray booths.
Cuts 90% off booth cleaning man hours.
FOR DETAILS WRITE
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UNISOL
PAINT STRIPPER
A New Development for Industrial Paint Stripping
- Non Inflammable
- Used Cold
- Works Rapidly on All Types of Finishes.
- Non Injurious to Hands.
- Unisol Liquid—For Dipping, Dries Rapidly With no After Film to Interfere With Repainting.

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Incorporated
1059 East 76th Street
Chicago 19, Illinois

Glamorize
your
Product
with

Cellusuede FLOCK

Cellusuede Flock is the ideal method of adding new life and sales appeal to a multitude of products—from automobiles to toys. Here is a versatile finishing material which enhances the beauty of merchandise, and at the same time provides a durable protective surface. Flock is easily applied to wood, plastic, paper, glass, metal, rubber, and cloth. It leaves a velvet-like effect soft to the touch and easy on the eyes. Cellusuede Flock is available in standard or special cut lengths . . . also standard or special colors. Application is best determined by the size and shape of the article to be flocked. If you will send a sample or blueprints of your product, we will suggest the most suitable method for your particular needs.

Send today for color card, price list, samples, and descriptive booklet.

Cellusuede Products, Inc.
ROCKFORD, ILLINOIS

The comparatively simple form of these door chimes has been treated with a fine lined texture on the base of the housing and a classical line drawing. The surface of the housing is red aluminum . . . a dyed-in-the-metal finish.

MUCH HAS been written about the three media of the industrial designer — form, color, and texture. However, too often in the creation of a design, the form is evolved without sufficient thought to the color and texture of the material to be used, and its possible influence in the selection of the form itself.

Before elaboration of this point there are several important factors in the choice of form, texture and color which should be considered first.

1. **Aesthetics**—Namely the selection of form, color and texture which is pleasing to our senses. There are certain colors for example, which are downright repulsive, just as there are forms which by themselves are extremely ugly. In good design, those forms, colors and textures which are, by themselves, unpleasant are avoided wherever possible.

2. **Tradition**—Many of our color likes and dislikes are closely associated with what we have been told is right or wrong. We all are familiar with the connotations of yellow for cowardice, red for passion, blue for coolness, purple for royalty. Some of these traditions are based on sound color psychology—notably red, the color of blood and fire, to suggest heat; or blue, the color of water, to suggest coolness. But take the case of purple. Merely because in ancient times the purple dyes of Tyre were used to dye the clothes of Kings, this color has come to suggest Royality and majesty.

Yellow is another case. There is nothing inherent in the color to suggest cowardice; psychologically yellow is a very bright and cheerful color. But here is just a case of tradition influencing our thoughts.

Tradition has gone much deeper than this. In our present civilization we see certain colors come in vogue for certain applications which are difficult to explain on a logical basis. Until very recently, it was considered scandalous for office machinery to be any color other than black. And everyone knows about Henry Ford and his black cars. (Any color, just so it's black).

3. **Function and Place of Use**—This is almost self-explanatory, although it needs a little clarification. The choice of color and form, as well as texture, in certain parts of the home and office is in part dictated by circumstances and in part by tradition. We don't use a crackled enamel finish in our bedrooms because it's too harsh, or a stainless steel finish because it would be physically uncomfortable. On the other hand we wouldn't use soft velvet as the finish on a typewriter for equally obvious reasons. These cases naturally are exaggerated; we rarely have to contend with such extremes. *(To page 23)*

BY GERALD STAHL

Designer of a wide range of modern industrial products, with offices at Twelve East 46th St., New York 17, N. Y.

On this ice cream mart, designed for the National Dairy Products Corp., the traditional white enamel is enlivened by a stainless steel counter, red counter front and base, and the red and grey Sealtest logotype. Note how monotony of large white area between the base and the counter has been relieved by the judicious use of horizontal lines.

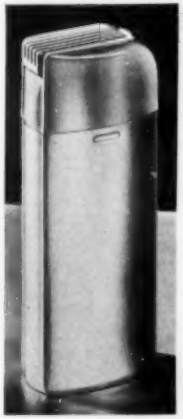
Taking these factors as a whole, let us now consider a typical problem. A table model radio cabinet is an excellent example. Basically our selection of form is limited only by the roughly parallelopiped shape of the chassis. Our selection of color and texture is unlimited within the bounds of reason.

Example: Radio for Kitchen; Form, Color, Texture

Starting with the questions of how much should this radio cost, at what price will it retail, and to what particular market is it being aimed—that is, farm, kitchen, portable, etc., the designer will ascertain specific requirements he must meet. Let us assume for this particular case that our manufacturer is considering a radio specifically designed for kitchens.

The present trend in kitchen design is toward color and away from all-white. However the consumer market for kitchen equipment is still controlled by the fact that the great majority of American kitchens are not new and many old ones can not be easily adapted to new trends. Therefore, articles manufactured primarily for kitchen use should be color designed to combine harmoniously with hard white, which in itself would present no problem as there are comparatively few colors which could be offensive. However, since even an all-white kitchen is usually relieved with some color "spots" according to the owners taste, as in curtains, dishes or decorative items, it is best to select neutral tones for mass production and sale.

Suppose then, that we settle on a rich ivory mottle. Here is where the importance of color and texture in their influence of the final form can be understood. There is enough interest inherent in the mottled ivory; it does not require lines and flutes. But a plain ivory surface would need some surface variation of form or texture to relieve the monotony. Or assume that in designing the cabinet, metal was specified. Perforated metal would not require the color or form for interest that a plain sheet would require. Crackled enamel would demand an entirely different color and form.



An example of how color and texture are used to create interest in the plain sides of this small pocket flashlight manufactured by Bantamlite Co. of New York. The top is molded of grey polystyrene plastic; the base is deep drawn brass finished in either red enamel or natural.

Having established the fact, then, that color and texture are important influences in the form of a finished product, how can we go about putting this to practical use?

Design Will Depend Upon Markets for Product

Here's one approach: Before attempting the design of an object, determine as nearly as possible just what its uses and markets will be. Modern sales management has been advocating this for years. In the case of our hypothetical radio cabinet, its usage and market dictated the color to us, or at least the range of colors. If we were designing a fire engine, or a fire extinguisher, our selection would be even more obvious.

Having made our selection of color, we must bear in mind our original point, namely that the choice of color,

form and texture is an integrated one. Our next choice will be that of texture. This will then dictate our final form. If we choose a smooth surface and a solid color, our surface will require a form which by itself will create the interest we seek. And conversely if we provide the design with an interesting surface texture, the form will not require the dominance of the previous one.

It should be borne in mind however, that the mere fact that an unusual form, a brilliant color, and an interesting texture have been used does not preclude a good design. We may place emphasis on one, possibly two, of these factors, but the inclusion of all three played up to the limit of their potentialities might cause chaos in the finished result. Good design is an integration of form, color and texture, and the sublimation of all three to the total effect. A properly coordinated whole is necessary for the success of any design.

Author's Note: I had originally planned two special designs for this article, but an unusual influx of business prevented me from doing it.

Editor's Note: Gerald Stahl interrupted his career in industrial design as a college instructor and professional consultant to enter the Air Forces as an aircraft engineer. Aside from the spectacular aspects, Stahl's experience as engineering officer in the experimental testing and development of the B-29 and later as flight test engineer and technical inspector of Atomic Bomb operations against Hiroshima and Nagasaki probably accounts for the great emphasis his present Manhattan industrial design firm places on technical perfection in product design and development. Since starting his organization only two years ago, Stahl has come to be recognized as one of the most promising industrial design firms and among the leaders in the profession.

Sterling Tool Products Co. Announces Promotions

Sterling Tool Products Co., Chicago, Ill., manufacturer of portable electric and air-driven sanders, announces several advancements in its sales organization.

D. A. Hutchison, formerly district sales manager for Illinois, Wisconsin and Indiana, has been advanced to the position of assistant sales manager for the company. In his new position he will direct the company's sales activities with their domestic distributor organization.

These men have been promoted by Sterling Tool Products Company.

At left (top) D. A. Hutchison

At left (bottom) Jerry J. Howe

At right (below) V. H. Drummond

J. M. Warnimont, who formerly held the title of assistant sales and advertising manager, now becomes advertising manager, devoting his entire time to the advertising and promotional activities of the company.

V. H. Drummond, formerly district manager for the company in Missouri, Kansas and Nebraska, has been promoted to district manager of the central territory formerly managed by Mr. Hutchison.

Jerry J. Howe, who formerly handled Sterling's sales, under Mr. Hutchison, to jobbers in the Chicago metropolitan area, has been transferred to St. Louis as district manager in the territory previously handled by Mr. Drummond.

Neil S. Rowe, after two years in Sterling's inside sales and service departments, takes over the Chicago territory sales which Mr. Howe relinquishes for his new position.

Spraying wrinkle finish in water-curtain spray booth. Only filtered air enters the finishing room. Part of baking oven appears at extreme right.

CHRYSLER AIRTEMP PRODUCTS FINISHED IN *Wrinkle Enamel*

By J. D. LOVELEY*

JACKETS FOR modern air-conditioning units, oil and gas-fired furnaces and boilers, are painted before assembly of the units. Air-conditioning units are assembled at the Airtemp plant but furnaces are shipped knocked down. This "on the job assembly" of a furnace means the possibility of scratching and marring its finished surfaces during handling.

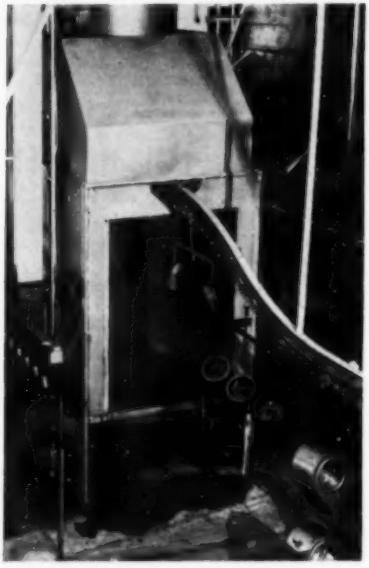
A wrinkle finish is less likely to be scratched or marred. Smooth enamel surfaces, on the other hand, are more difficult to touch up with an air-drying enamel. Another important reason for our using wrinkle enamel is the hiding power of the wrinkle pattern. Fine die marks and spot weld im-

*Metallurgical Engineer; Chief Inspector at Airtemp Division, Chrysler Corporation, Dayton, Ohio plant.

pressions are not noticeable under a wrinkle finish, but they would have to be smoothed out perfectly for a smooth enamel finish.

Conveyorized Cleaning, Bonderizing, Painting and Drying Facilities

Airtemp has two plants at Dayton. Both have complete conveyorized Bonderite, painting and drying oven facilities. All cooling equipment, including air-conditioning and commercial refrigeration units, is manufactured in a modern, windowless, completely air-conditioned plant, 640-ft. long by 350-ft. wide. In this building the 1080-ft. conveyor is loaded with parts to be painted in the spot-welding department. Traveling 9-ft. a minute the finished work arrives at the point of assembly two hours later.



All parts to be painted go through the metal cleaning and Bonderizing setup before any painting begins.

Why a wrinkle finish is used on these products, how the surfaces are made ready for painting, and the technique of spraying on a 2-coat wrinkle enamel followed by a single oven baking at 250° F.

In the older building, panels, tops, etc., for furnace jackets are loaded on the conveyor in the spot-welding department, and come off the conveyor 1½-hours later, all ready to pack for shipment. Moss green metallic and sandstone gray metallic wrinkle enamels are used on both heating and cooling units to insure color harmony where a cooling unit is installed along with a heating unit to provide year around air conditioning.

The spray Bonderite system is used with tunnel type construction. The spray areas are of such length that each of the following steps lasts at least one minute.

Alkali-emulsion cleaner	160° F.
First hot water rinse	160° F.
Second hot water rinse	160° F.
Bonderite	160° F.
Cold Water Rinse	
Chromic-phosphoric acid rinse	(Cold)

The work is then dried in a direct fired oven for six minutes at 275° F. The time allotted from hang-on-point to the first spray booth is 30 minutes.

Technique of Spraying and Drying Wrinkle Finish

The wrinkle enamel is sprayed on as two wet coats with only one bake. The first coat is applied in a spray booth 40-ft. ahead of the second booth where the finish coat is sprayed. Because the first coat has a chance to "flash" (set up and begin to dry) for nearly five minutes before the second coat is applied, a good film thickness is built up without the danger of sags or coarse wrinkle. *(To page 32)*

REFLECTS SATISFACTION FOR YEARS TO COME!

Bonderizing

preserves and protects fine finishes!

The sleek, shiny, smooth *look* of a car is one of the owner's greatest satisfactions. And to prolong that satisfaction, most manufacturers provide lasting fine finish protection by Bonderizing.

By a simple, economical chemical conversion process, Bonderizing changes the surface of metal to a fine, tight nonmetallic crystalline coating. These Bonderite crystals anchor paint tightly to metal, greatly retard rust and corrosion, minimize the spread of finish failure around accidental scratches and finish injuries, preserve fine appearance.

Bonderizing is used by most manufacturers of cars, trucks, and buses, and by leading manufacturers in many other fields. It's a product improvement and a sales feature.

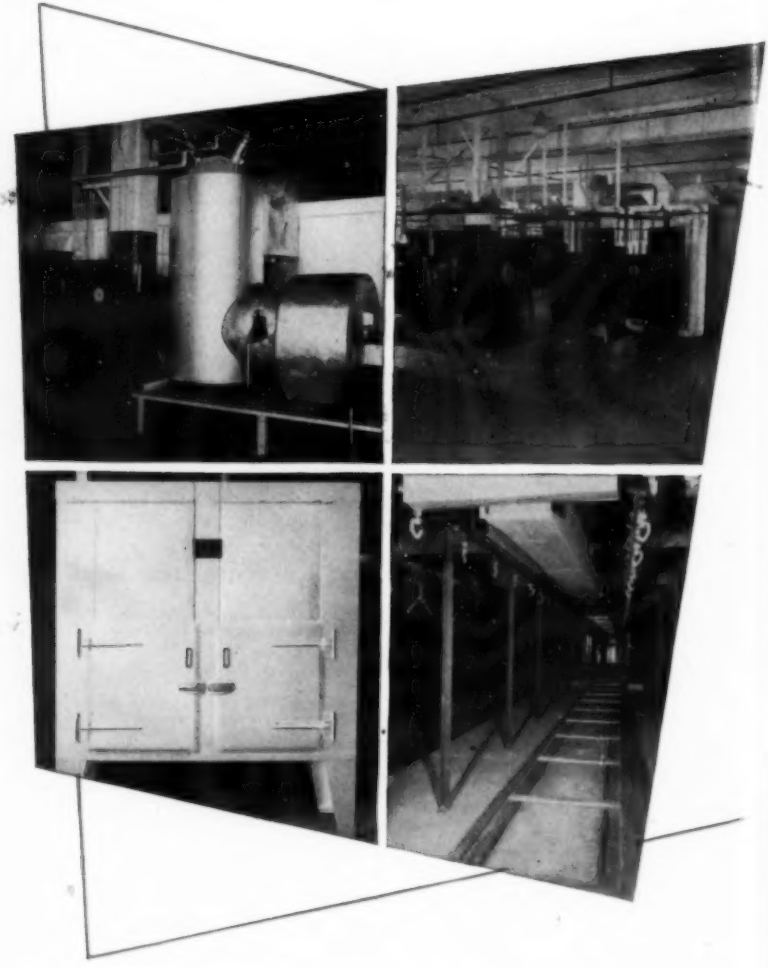
Your product should have the advantages of Bonderizing!

PARKER RUST PROOF COMPANY, 2176 East Milwaukee Ave., Detroit 11, Michigan

BONDERIZING Holds Paint to Metal — PARKER PROCESSES — **PARKERIZING** Inhibits Rust — PARKER PROCESSES — **PARCO LUBRIZING** Retards Wear on Friction Surfaces

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

INDUSTRIAL OVENS



AND DRYERS

BUILT

DESIGNED

INSTALLED

by FERRO

Who's going to do the job? That's the important question to be answered when planning the installation of a new industrial oven or dryer—and that's where Ferro fits into the picture.

Designers and builders of more than 89% of all modern Porcelain enameling furnaces, Ferro has also built hundreds of driers . . . and ovens for organic finishes. Moreover, Ferro has constructed any number of complete finishing plants, then provided practically everything necessary to operate these plants efficiently. And, if yours is a special type installation, Ferro has the research and engineering "know-how" that can supply the answer to your particular problem.

In short, Ferro Enamel is prepared to assume undivided responsibility for your oven, dryer or complete finishing system—the one, all-important factor that should be considered when planning your next installation. Call or write for a consultation today!

FERRO enamel corp.

4150 east 56th street

cleveland 5, ohio

Branch Plants in Los Angeles, Calif., and Nashville, Tenn.

The wrinkle enamel at the gun is 65 seconds viscosity (measured with a Ford No. 4 cup) at 78° F. temperature. Tank pressure is 25-lbs. per square inch and the atomizing pressure (at spray gun) is 70-lbs.

The finish coat of wet enamel is allowed a 3-minute flash before it enters the direct gas-fired oven for baking at 250° F. for 20 minutes, with a total time in the oven of 30 minutes. Fresh air is mixed with the recirculated air in the oven to keep oven "fouling" down to a minimum.

A "flocoat" installation in series with the spray booths enables the black enamel work on heating equipment to be finished with a minimum of labor. Parts are cleaned and Bonderized the same as for wrinkle finish.

The most important factor to insure a good paint job is proper cleaning and a uniform surface. Airtemp maintains careful control of the cleaning and Bonderite operations, so the metal surfaces to be painted are uniformly perfect—or in as nearly perfect condition as possible. Careful control of paint viscosity and oven temperature are the other two important factors that insure a coating that protects the metal and guarantees an attractive and durable finish which is appreciated by the customer.

Where parts are placed on chain conveyor.

Quality Paint Brushes Again

"Quality paint brushes at 1941 price levels are again available for the first time in six years," Kent D. Currie, Sales Manager of the Brush Division, Pittsburgh Plate Glass Co., told the National Paint, Varnish and Lacquer Association in Atlantic City, N. J., recently.

"For nearly five years brushes were scarce, high in price and—due to circumstances beyond the control of the industry, or the government of the United States, for that matter—sub-standard in quality. No one was more acutely aware of this than members of the American Brush Manufacturers Association themselves," he said.

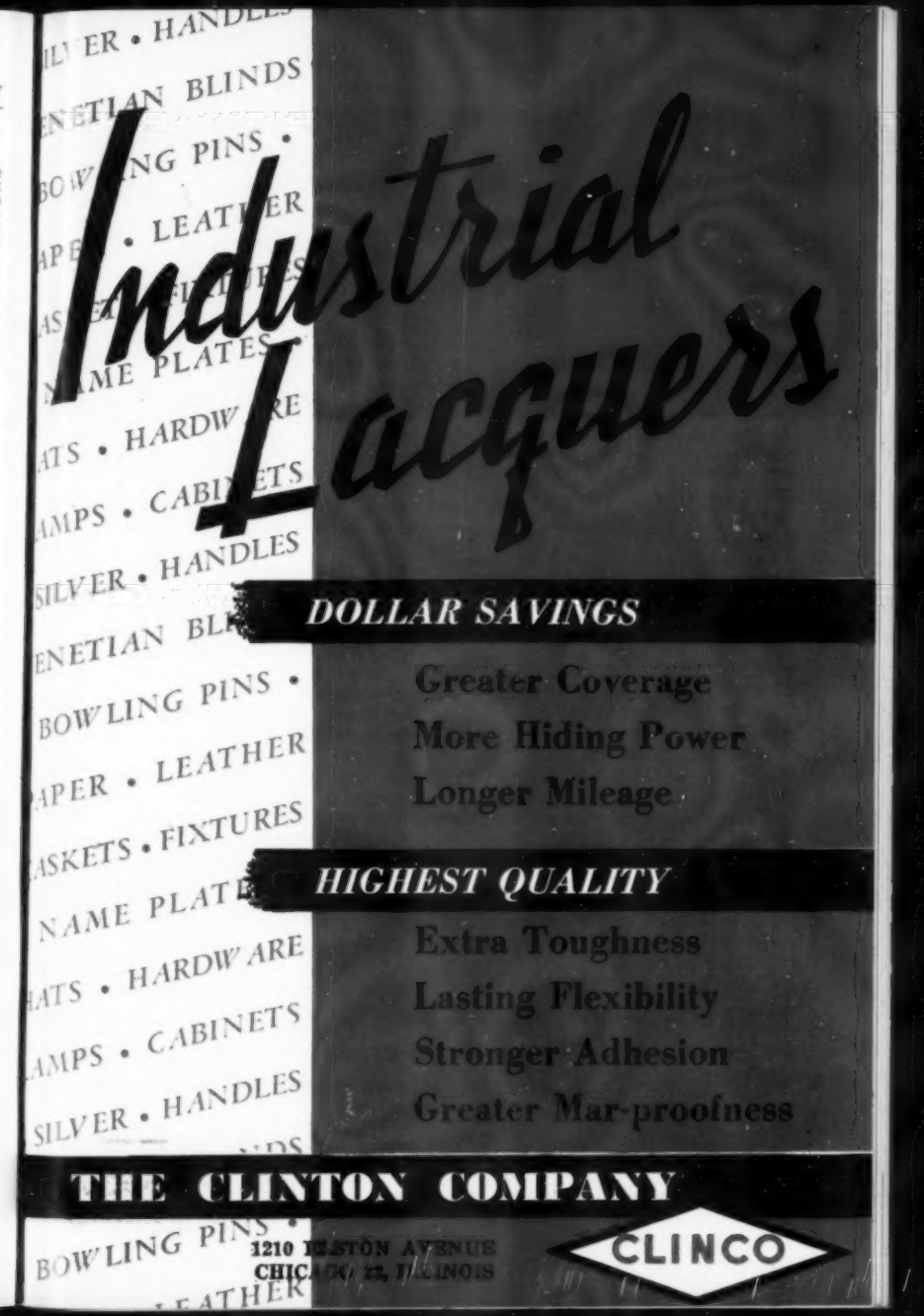
"Individual brushes will vary widely, of course, but broadly speaking brushes today are back in the price range of late 1941 or early 1942. Furthermore, quality is the highest it has even been in the last six years," Currie concluded.

Mixing Equipment Co. Appoints Southern Representative

Allan Edwards, Inc., Tulsa, Okla., pipe line, refinery and gasoline plant equipment engineering firm, has been appointed exclusive representative by the Mixing Equipment Co., Inc., of Rochester, N. Y., for Oklahoma, Kansas, Texas Panhandle districts, and Fort Worth and Dallas territory. The organization will handle engineering and sales for the Mixing Equipment Co. lines of portable, turbine type and side entering mixers for fluid agitation and mixing.

Scotty Edwards of Allan Edwards, Inc., Tulsa, Oklahoma firm which now represents Mixing Equipment Co.

Principals in the Edwards firm are A. J. (Scotty) Edwards and J. D. Irons. Mr. Edwards is widely known in oil circles, having been actively engaged in the oil field equipment business for the past 25 years.


Industrial Lacquers
DOLLAR SAVINGS
Greater Coverage
More Hiding Power
Longer Mileage
HIGHEST QUALITY
Extra Toughness
Lasting Flexibility
Stronger Adhesion
Greater Mar-proofness
THE CLINTON COMPANY
1210 KILSTON AVENUE
CLINCO

The PULLMAN-STANDARD FINISH

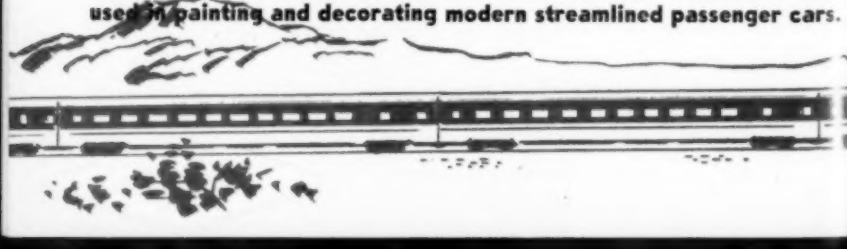
MODERNIZATION of passenger cars has increased the quantity and size of interior parts to be finished. Color also has been added — running from light pastel shades to bright gay colors — with drapes, carpet, rubber tile, murals, and even wallpaper, all blended to make up today's car interiors. Materials include steel, aluminum, wood, plastics, stainless steel and glass. Beauty is a requirement. Durability is a must. Today, perhaps this demand can be met better than ever before with modern synthetic enamels.

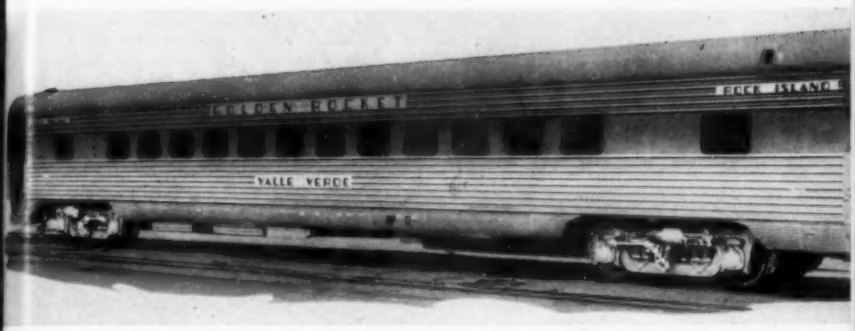
Upon completion of a car shell (or superstructure) and before any insulation or air-conditioning ducts or equipment are installed, the interior (that is the back or reverse of the outside, and the roof sheathing, including structure members) is washed with mineral spirits. This cleaning is followed with a spray coat of oil-base primer. The consistency of the primer is such that it will flow into narrow spaces and crevices, thus sealing them.

After an overnight drying the primer coat is followed with a heavy coat of sound deadening and insulating material, sprayed on to a thickness of 3/16-in. to 5/16-in. This material has an asphaltum base and contains grains of cork 20 to 30 mesh size. To give you an idea of its consistency, special equipment, such as pumps and spray guns, are required. Material pressures of 80 to 100-lbs. per square

By W. J. BOLTZE

Part 2 of a two-part article in which the Foreman of Painting for Pullman-Standard Car Mfg. Co. at Chicago, describes the methods used in painting and decorating modern streamlined passenger cars.





A car from the Rock Island's "Golden Rocket." Stainless steel is used below the window line, with Southern Pacific red above and on the roof. Stainless steel nameplates are etched and finished in black. Photograph, courtesy of the Rock Island Lines.

inch are necessary to maintain a constant flow of material from the gun tip. Atomizing pressures of 40 to 50-lbs. are used. After an air-drying period of 36 hours, the thickness of the coating will be reduced slightly in thickness.

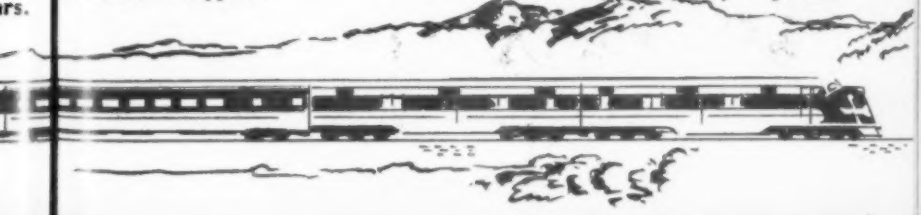
With the foregoing operations completed, the car has insulating battens of 2-in. to 3-in. thickness applied, between structure members of the roof, walls and on the sub-floor—followed with the application of arched flooring and the installation of ducts and overhead air-conditioning equipment.

The car is now ready to receive inside finish parts which have been primed elsewhere. This work completed, it is moved to the paint shop for painting. The whole interior surface is cleaned with mineral spirits—and spot primed where any surface has been ground or scuffed The car is then moved to an "inside" spray booth where a coat of light colored surfacer is applied.

Overspray and fumes are drawn through end doors and window openings from inside the car (from left to right) and directed down, by hinged baffles, through metal grilles into a horizontal water curtain at both sides, outside the car. Exhaust fans maintain an air velocity, through the inside of the car, of about 160-cu. ft. per minute directly opposite openings, and well over 100-ft. per minute in obstructed areas.

After an overnight drying, the surface is carefully inspected and any small defects are spotputtied before the walls and ceiling panels are knife-glazed. The following day the entire surface is wet-sanded, using first, No. 180 and then No. 240 abrasive paper and water. Next the interior is given a spray coat of sealer or undercoat which is allowed to dry overnight.

Inside walls and ceiling panels are given their first coat of synthetic rubbed-effect enamel. After air drying 12 hours, followed by inspection



"Train of Tomorrow", an experimental train launched by General Motors, its designer.

paper. The second and third coats of enamel are sprayed on the walls, allowing an overnight period of air drying between coats. If more than one color is used on the walls of any room, one area is completed and masked; then the other color is applied.

Doors, bunks, roomette beds and all wood and metal furniture for dining, club and lounge cars, as well as miscellaneous interior fittings, are finished completely in the finishing room. They receive the same surface preparation and the same undercoats and enamel coats as are applied to the car. The only exception to this is the small miscellaneous parts which are dip cleaned in tanks with commercial cleaners.

With the exception of the conveyorized spray booth in the finishing room, which is a water curtain type, all other booths in these rooms are of the water-wash type.

The car spray booths are semi downdraft water type. These are divided into outside and inside booths for spray coating the outsides and insides of cars. The spray booths for painting the outsides of passenger cars have a center pit for spraying underframes and equipment on the underside of each car. They also have adjustable steel scaffolding of the counterbalanced type on both sides for workmen to stand on while spraying the upper parts of cars.

Three diesel-powered locomotives are used for moving cars around the plant and yards. Traveling transfer tables at track level are located between the shops to move cars in and out of spray booths and to transfer cars to tracks and sidings for operations which must be performed outside the spray booths.

The spray equipment is supplied with materials from pressure tanks instead of from a central paint supply system, because of the different colors required by various railroads.

Railroad passenger cars have been standardized to some extent as to size; however there is no point in trying to accumulate a large stock of parts or units, as the interior arrangements vary with each railroad.

There's a Du-Lite Cleaner*

FOR EVERY

METAL CLEANING NEED

With the addition of No. 72, Du-Lite's new cleaner for aluminum, zinc, and other soft metals, Du-Lite now offers the metal finisher and production man a cleaner to meet every metal cleaning need. Compounded with Du-Lite's Titronne, a remarkable wetting agent, No. 72 Cleaner will not harm, etch, or stain soft metals, while maintaining highest cleaning efficiency—and economical, too, at 11¢ a pound in 375 pound drums.

Du-Lite's No. 29 Cleaner, also activated with Titronne, is a standard cleaner for iron, steel, and brass. Its improved detergent and water depressant properties will quickly remove and dissipate soil and heavy greases, penetrating even "the hard to get at" places created by seams, blind holes, and zigzag crevices. Used 2 oz. per gallon as a soak, electrolytic; or barrel cleaner. Sold in 375 pound drums at 10¢ a pound.

TITRONNE AVAILABLE FOR YOUR OWN USE

Titronne is sold for general industrial uses. Non-irritating and non-toxic, Titronne can be used in soft or hard water, and in acid or alkaline solutions. A 3% concentration will reduce the surface tension of aqueous solutions by more than 50%. Titronne may be used advantageously as an addition to metal and textile cleaners.

Your inquiry regarding either the No. 72 and 29 Cleaners or Titronne will receive our careful attention.

THE *Du-Lite* CHEMICAL *Corporation*

140 River Road . . . Middletown, Conn.

COST OF FINISHING

By C. RAYMOND SYER

Consulting Finishing and Industrial Engineer

WHAT IS the cost of finishing our product?" This question is often asked by management. It is seldom that an accurate finishing cost per item can be given. The estimates generally quoted are often far out of line when or if actual costs are really determined. Many surprising facts will be uncovered when you make a complete study of the actual costs pertaining to the finishing of your product, if accurate records are not now available.

Only a short time ago I was engaged to make a survey of the painting and production methods of a large nationally known company. At the completion of this survey I submitted a report to management stating that the cost of finishing the product could not be determined at the time because of lack of available finishing costs. However, an estimated savings was mentioned in my report — savings which could be made without laying out any immediate investment for equipment; and an additional savings would materialize through the installation of a conveyor setup.

When the executives read my report they immediately divided their yearly production figure into the cost of the estimated savings quoted. The savings appeared to be fantastic, as they were of the opinion that the savings mentioned represented considerably more than they were actually spending per machine.

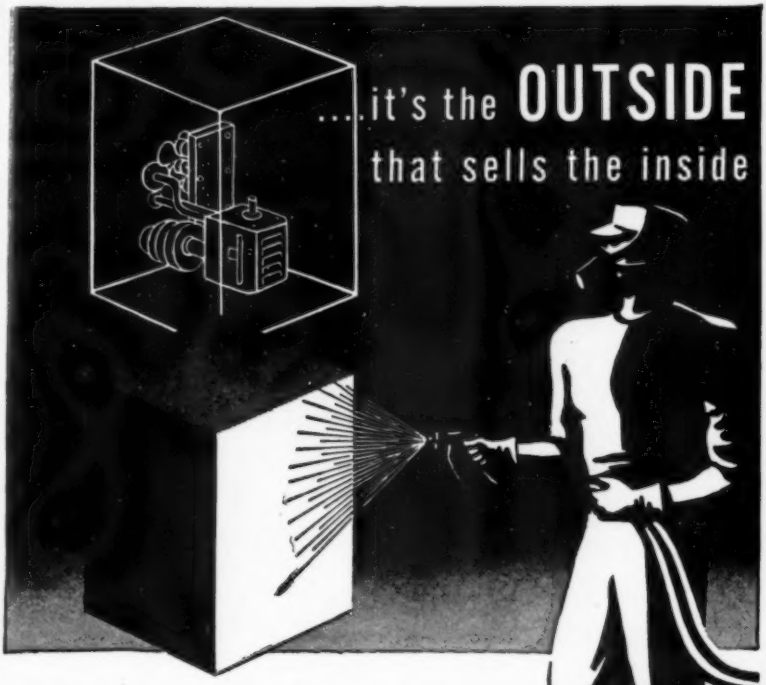
Then it was decided to tabulate the cost of each finishing operation on each part. With actual costs established we could figure the correct percentage of savings that might be expected after adopting improved methods. Much to their surprise the actual cost figures obtained represented at least three times more than what they had in their estimate.

Closely Checking Costs Reveals Many "Leaks"

While checking into the cost of each finishing operation against each individual part, certain key executives began to question why and when various operations were preformed and, in some cases, if correct methods were being used. It was then determined that in some cases new methods of finishing could be adopted whereby costs could be reduced and an improvement could be made in both the finished appearance and design of the product.

Many times, actual savings and a real improvement in the finish can be made at once, without any immediate investment being laid out for equipment. When corrective methods such as the use of proper spraying technique, standard air pressures and viscosities, etc., are adopted, savings will appear. These accumulated savings can be ear-marked and applied against the cost of all necesary equipment required to place production on an efficient conveyorized basis. The usual result is additional savings, an increase in production, and better working conditions.

In determining accurate costs, management should take into consideration all factors pertaining to the preparatory operations necesary to make



Yes YOUR product has that ever-loving sales appeal when it's coated with a more attractive finish!

To put a BETTER finish on metal in LESS TIME, at LOWER cost, standardize on UNITED'S Lacquers, Enamels, Synthetics, Thinners and Special Coatings.

WANT PROOF?

Put YOUR metal finishing requirements up to US! We'll recommend the finish that will best suit your production needs — and send you a generous working sample—all without obligation on your part.

"FIRST WITH THE FINISH"

United Lacquer Mfg. Corp.

General Offices, Laboratory, Factory: LINDEN 3, NEW JERSEY
New England Plant: EVERETT, MASSACHUSETTS

UNITED LACQUER MFG. CORP.

LACQUERS
THINNERS
SYNTHETICS
METALLIZED FINISHES
SPECIAL COATINGS

surfaces suitable for receiving and holding an enduring and attractive finish. These preparatory operations may include smoothing, cleaning or degreasing, Bonderizing, etc. They all affect and enter into the cost of finishing. Cost of materials, labor, maintenance, operating costs, overhead, etc., should be figured. If these figures are not obtainable then an accurate cost of finishing the product can not be known.

I am sure that it will surprise some executives to learn what it is actually costing them to finish their products. Conditions that make it necessary to set aside and repair-finish many rejects will cause a sharp rise in the overall finishing cost.

In many cases it will be found that delay in the installation of modern and efficient equipment and methods in the finishing department is expensive from a cost standpoint—while at the same time there is added difficulty experienced in producing the desired perfect finish.

A complete story and analysis of present painting operations, together with a record of cost for each operation, and with a determination to replace all antiquated methods and equipment with modern equipment and efficient methods, will certainly pay substantial dividends—and enable the firm to continue in business.

A. P. Pahl, New Technical Director for W. P. Fuller & Co.

Walter D. Jones, veteran technical director of W. P. Fuller & Co., San Francisco 19, Calif., retired from active duty November 1 after 40 years of service with the pioneer western paint, glass and wallpaper firm.

A. P. Pahl, formerly manager of the South San Francisco laboratories, succeeds Mr. Jones as technical director in charge of all the Fuller laboratories.

During his long career with W. P. Fuller & Co., which started in Spokane, Wash., in 1907, Mr. Jones has been active in both the sales and technical divisions of the paint business. After a number of years spent in retail and wholesale selling activities in Spokane, Mr. Jones transferred in 1922 to the Technical Service Department in San Francisco. In 1935 Mr. Jones left the Technical Service Department to become technical director.

A. P. Pahl is now Technical Director in charge of all W. P. Fuller & Co. Laboratories.

Mr. Pahl, the new technical director, came to the Fuller laboratories in South San Francisco in 1930, immediately after his graduation from North Dakota State College at Fargo, N. D. In college he studied under the noted paint chemist, Dr. L. L. Carrick, at that time Professor of Chemical Engineering and head of the Paint Technology Department at Fargo, and it was upon Dr. Carrick's recommendation that he joined the W. P. Fuller & Co. staff.

In 1936 Mr. Pahl was appointed manager of the laboratory at the Fuller factory in Los Angeles, a position he held until earlier this year when he was appointed manager of the company's South San Francisco laboratories.

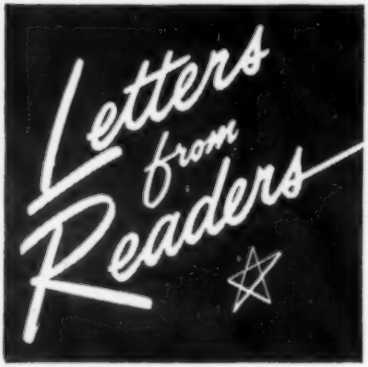
Maas & Waldstein Co. Awards Prizes for Performance

Winners of the recently conducted sales contests, held by Maas & Waldstein Co., 438 Riverside Avenue, Newark, N. J., for its non-flammable spray booth compound, were announced by G. Klinkenstein, Vice-President of the company at the October General Sales Meeting held in Newark for the Eastern Division and in Chicago for the Mid-Western Division.

Mr. Floyd M. Erienmeyer, the Connecticut representative, was awarded a solid gold wrist watch for developing the greatest volume of sales for Booth Coat No. 19 from the Eastern Division, while Mr. C. F. O'Neal and Mr. R. B. Stevens were awarded solid gold wrist watches as winning representatives of the Mid-Western Division.

Participating also in the booth compound contest was the Essex Chemical Co., Newark, N. J., division of Maas & Waldstein Co., whose representative, Mr. B. Warren, received a solid gold wrist watch as the winner in that Division.

S-Y
STILLE-YOUNG
Manufacturers · LACQUERS · FILLERS
STAINS · ENAMELS · PAINTS · Chicago 14
Tailor-Made
Our long list of standard items may contain exactly what you require. But if not, we'll formulate it for your special process.
LIGHTER TONES
Blond, Champagne, and Harvest finishes are moving into lighter phases than ever.
6435 Extra Pale Sealer
gives all that you need in sealing properties, ease of application and sanding—coverage, production and economy. Stays away from color-cast.
6422 Non-Casting Semi-Gloss Lacquer
produces a beautiful, rubbed-effect finish for all light toned work. Water-clear.
This is the ideal combination for work on bleached or pale-toned finishes of every type.
Phone—write—or wire.



More Firms Offer Glass Beads

In October 1947 issue of INDUSTRIAL FINISHING, on page 98, we noticed an article concerning an inquiry on reflective sign material, signed by the "A.P.Co." (Also, see page 80 of Nov. 1947 issue). It appears as though information was desired on our reflective sign sheeting "Scotchlite."

For your evaluation, we are sending you our "Scotchlite" color card which has mounted on it the various colors of "Scotchlite" that are obtainable. This material is a rosinous plastic and may be obtained in rolls of 24-in. in width.

The particular characteristic of "Scotchlite" is that it reflects light toward its source in a narrow cone instead of scattering it, as in the diffused type of reflector, or at an angle away from its source, as in the mirror type of reflector. The durability and economy of the product make it one of the most outstanding reflex reflectors in use today.

"Scotchlite" offers, for the first time, the opportunity to reflectorize outdoor advertising in its full color, giving the same daytime appearance at night. "Scotchlite" signs convey their message and images in their full color brilliance 24 hours a day.—(H. V. Jones, Phila. Branch of "Scotchlite" Division, Minnesota Mining & Mfg. Co., St. Paul, Minn.).

Another source of supply for the product originally asked for, is Flex-O-Lite Mfg. Corp., 3130 Chouteau Ave., St. Louis 3, Mo. (Makers of Flex-O-Lite reflective glass beads for highway, airport and warning signs, advertising signs, center lines, safety zones, runway numerals, etc.).—ED.

"Duro Seal" Found

Regarding W. S.'s question with reference to "Duroseal" in the November 1947 issue, page 78, we are enclosing herewith a few pieces of literature regarding this material. Further information may be obtained from the International Chemical Co. (the manufacturer), 3130 S Canal St., Chicago, Ill., phone Victory 3140.

We have at times used this material and found it satisfactory for specified uses. We are not dealers or distributors of same, and have only used it in our own processing.—W. I. Inc., (M. W. Desens).

Thank you, Mr. Desens.—ED.

"Electric Spraying of Paint"

Being a reader of INDUSTRIAL FINISHING, I have been prompted to write you concerning any information you might have relative to Electric Spray, an electrical method of spraying paint. Can you tell me where I can get in touch with the method?—L.W.M. (Engineering Dept.) P. Mfg. Co.

We do not know what you mean by "Electric Spray"—unless you have in mind Electrostatic Spraying which has been publicized repeatedly in both the editorial and advertising pages of INDUSTRIAL FINISHING Magazine during recent years. An article about it appeared in October 1947 issue, beginning on pages 62 and 63; and in August 1947 issue, starting on pages 28 and 29. A 2-page advertisement appeared in the September issue on pages 22 and 23; and in Nov. 1947 issue, pages 28 and 29.

For further information, we recommend that you read these articles and advertisements, and then communicate with the Harper J. Ransburg Co., 1238 Barth Ave., Indianapolis 7, Ind.—ED.

Lacquer Decal Wanted

In October 1947 issue of INDUSTRIAL FINISHING, page 106, we notice something about lacquer decalcomanias for finishing furniture. We are manufacturers of office posture chairs and have recently received a request for special graining on a small order.

We want to know where we can obtain lacquer decalcomanias, and full information as to the application of this product. We will appreciate it greatly if you will advise us who manufactures this item, and any other information that would be helpful in obtaining such material.—C.P. Co. (A Chair for Every Seated Worker).

We suggest that you contact The Meyercord Co. (Attn.: R. F. Rautenbush), 5323 W. Lake St., Chicago 44, Ill.—ED.

We Want Paint Sludge

In October 1947 issue of INDUSTRIAL FINISHING, on page 98, and also on page 100, there are inquiries regarding purchases of paint sludge, as well as information desired on disposition of dry lacquer overspray.

We discontinued advertising (We pur-

Hello...

Here's Another Fine Product Finished with Egyptian

Stromberg-Carlson is a stickler for quality in finish as well as in everything else.

So the fact that they rely upon Egyptian for the base of their 1243 telephone is significant to every manufacturer with whom finish is a factor.

Whatever your finish requirements, you can rely on Egyptian.

THE EGYPTIAN LACQUER MANUFACTURING COMPANY

SPECIALIZED PRODUCTION FINISHES

P. O. BOX 444 NEWARK, N. J.

chase and/or reclaim overspray from water curtain spray booths) in your magazine about six months ago, due to our campaign being too successful and our inventory increasing too rapidly. However, we intend to re-enter the market sometime after the first of the year and undoubtedly will resume advertising.

In the meantime, we would appreciate your keeping us in mind regarding inquiries of this sort.—MECKLER CHEMICAL CORP., 3748 E. 91st St., Cleveland 5, Ohio.

In the event you have any inquiries with regard to the disposal of paint sludge which is generated as "overspray" in the spray painting process, we would be glad to have you recommend these inquiries to our company. This has been our work for more than 20 years, and we are the originators of paint reclamation.

This letter was inspired by an article appearing in October issue of INDUSTRIAL FINISHING, wherein on page 98, and also on page 100, someone inquired as to disposal of this material. We pay a fair price for this material and give adequate instructions as to the methods of handling accumulations and subsequent shipment. —NATIONAL TITANIUM CO., 2330 E. 37th St., Vernon, Calif.

Venetian Blind Roller Coater

We have noted with interest the article "Roller Coating Venetian Blind Slats" in October issue of this magazine (pages 72 to 76). Could you kindly advise us the name of the manufacturer, or the distributor of this type of machine, and if there is a Canadian distributor of this type of equipment?—O.P.W., Ottawa, Can.

Durable Peel-Off Coating

We have a problem in connection with packing our lawn mower handles for shipment. It has come to my attention that there is a company now in the market with a commercialized adaptation of the cacoon method of covering and preserving guns and similar equipment on our naval vessels.

This process would seem to have some possibility if it could be successfully applied to the packing of our lawn mower handles. We are wondering if you can supply the name and address of the company making this material?—J.L.M.Co.

There are probably 20 concerns making durable protective coatings which can be peeled off easily and quickly. In a letter we are naming a few of them.—ED.

Who Makes "Softone" Finish?

In the current issue of the Office Appliances Magazine there is an announcement by the Wood Office Furniture Institute of a new finish called "Softone." Can you give us any information regarding materials and procedure on this new finish? We would appreciate hearing from you at your earliest convenience.—O.S.M.

We are not familiar with the finish you name. There are several wall paints marketed under this name. Can some reader help us on this?—ED.

Hot Lacquer

We would be pleased if you will send us a copy of the article, "Hot Lacquer" by S. W. Simms, as published in May 1939 issue of INDUSTRIAL FINISHING Magazine. —A/S Jecobsens Farveudsalg, Oslo, Norway.

We are sending you the last reprint we have of this very popular article.—ED.

Testing Finishing Materials

We are in need of some means of testing the quality of the finishing material that we are using, and samples that are being sent us by firms eager to supply us with materials.

Please advise if you have any publications on this subject, or if any of your advertisers can furnish testing equipment. Also, advise if there is some laboratory that could give us a chemical analysis of these materials.

P.S. We are anxious to contact any supplier that has a superior finish to use on the tops of kitchen tables.—H.Mfg.Co.

We have published several articles on this subject—some very good ones—one of the latest and most complete having appeared in March 1947 issue, beginning on page 77. Perhaps you have a copy of this issue, or could obtain one from some local reader who keeps his copies of INDUSTRIAL FINISHING Magazine. We have had so many requests for tear sheets of these articles that our supply is exhausted.

There are several testing laboratories, one near you being Crystal Laboratories, 643 Virginia St., Crystal Lake, Ill.

Any one of several advertisers in INDUSTRIAL FINISHING Magazine can supply you with a durable finish for the tops of kitchen tables. Write or telephone them. —ED.

Wiping Cloths; Tack Rags

We wish to learn as much as possible about the use of textile fabrics in the finishing industry and in the manufacture of paints and varnishes. We would appreciate your sending us any information that relates to the use of textiles in these trades.

In particular, we would like to learn something about cloth as used in tack rags. If you could give us any information about tack rags, how they are used,

RESEARCH-FITTED TO SUIT YOUR NEEDS EXACTLY

CARPET

FELT

MOHAIR

SUEDE

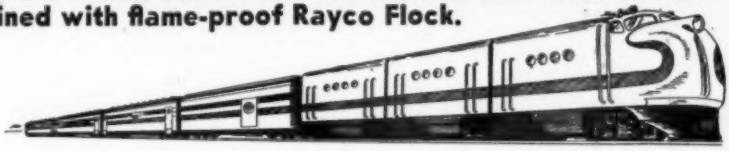
VELOUR

"SPANGLES"

Rayco Flock Synthetic Finishes

IN ANY COLOR—ON ANY MATERIAL

In the FREEDOM TRAIN the historical document cases are lined with flame-proof Rayco Flock.



Rayon Processing Co. of R. I., Inc.

PIONEER PRODUCERS OF SURFACE COATING FLOCKS

55 Tremont Street Central Falls, R. I.

COLONIAL PROCESS SUPPLY CO.
140 W. 23rd St.
New York 11, N. Y.

GRAPHIC ARTS CENTER
908 S. Main St.
Los Angeles 14, Calif.

ATLAS SPEC. MFG. CO.
3255-59 S. Shield Ave.
Chicago 16, Ill.

W. H. HALL
182 Jarvis St.
Toronto, Ontario

and the cloth from which they are made, it would be greatly appreciated. If it is possible for you to give us some rough estimates of the yardage of cloth used per year in tack rags, it would be a great help.—K.Mills.

Finishing rooms throughout the country use many tons of used cloth for wiping rags in various operations connected with finishing—but how many tons we do not know.

Also, some select fabrics are used for straining paints and enamels. How much, however, probably no one knows.

We are not in position to answer all of the questions you have put to us about the manufacture of tack rags. As you probably know, the modern tack rag is a development from what the old-time finisher prepared for himself—a non-linty clean rag or piece of cloth, soaked in slow-drying varnish and then the varnish was squeezed out—leaving the rag "tacky". With this kind of a rag the finisher would lightly wipe furniture just before giving it the final coat of varnish. This tacky rag picks up any lint or dust particles that might be on the surface—and leaves no lint or dust.

Later, some individuals and concerns started improving on the old homemade tack rag—but just what kind of cloth they use and what kind of preparation they apply to the rag and what yardage of this material is used annually, we do not know.—ED.

Potato Masher Handles

We are particularly interested in putting a good finish on wooden potato masher handles, and want to get as much information as we can on how other people are doing it. You may have suggestions as to how we can get the information.—Z.W.

Suitable coating materials can be obtained from any of several firms advertising in this magazine. Method of application will probably be by dipping although, depending upon conditions, it might be desirable to use a tumbling barrel or whirl coating machine.—ED.

Transparent Coating for Photos

Q Can you supply the names of manufacturers of clear transparent lac or spirit varnish suitable for use, with silk screen, over the surface of photographs to give them a high gloss, as well as make them waterproof? These are ordinary photos and one supplier's material differs in results for each batch we get.—N.P.S.

In a letter we are suggesting a few concerns that can probably supply what you want.—ED.

Varnish Modernization in Four Glidden Plants

Four major paint and varnish plants of the Glidden Co., Cleveland, Ohio, are sharing in a $1,000,000 varnish modernization program. Extensive modernization work has been undertaken at Glidden's paint factories in Cleveland, San Francisco, Reading and Minneapolis. Each plant is being equipped with the latest facilities for quantity production of alkyd resins, other synthetic resins and oleo-resinous varnishes.

New equipment now being installed in the four plants will capitalize on one of the first important changes in varnish production in more than 50 years. Varnish formerly produced in 100-gallon to 350-gallon lots now will be made in quantities up to 2000 gallons. Furthermore, production will be better controlled and costs will be lowered.

One of the most important improvements resulting from the program is the elimination of open-fire varnish production. New units will "cook" the varnish by indirect heating, with a tremendous boost in safety.

Mr. A. D. Duncan, vice president of the company, points out that alkyd and other synthetic resins have brought tremendous improvements in paint and varnish production, many of them a direct result of war-speeded research. Alkyds resins, he said, are particularly valuable in imparting greater durability and superior color and gloss retention to enamels of all kinds.

The extensive Glidden modernization program is expected to be completed in 1948.

Chemical Div'n. of Bede Products Sold to Beck Equipment Co.

Last month, formal announcement was made of the sale and removal of The Chemical Division of Bede Products, Inc., to The Beck Equipment Co., 1421 W. 58th St., Cleveland, Ohio.

Beck Equipment Co's. line of products includes paint removers, soaps and hand cream, metal cleaning compounds, water wash spray booth compounds, spray booth coatings, spray painting supplies and equipment.

High Purity Silica Powder

Silica powder of high purity and submicroscopic fineness is now being produced in pilot plant quantities by The Linde Air Products Co., Unit of Union Carbide and Carbon Corp., 30 East 42nd St., New York 17. Preliminary investigations indicate that this powder may reveal new and effective applications in paints, lacquers, rubbers, elastomers, textiles, and lighting.

Finishing Setup Developed to Produce Economically

Rejects of finished work were excessive and, of course, volume output was low while production costs were high. Several causes were found and corrected. Result: volume went up; costs down.

By GREGGS PHILLIPS

THE SALVATION to our economy rests with greater production. An economist, in his approach to the situation, points out that about 85% of the cost of finished goods is for labor. Looking at the situation broadly the national economy picture has changed its color, but from fundamental standpoints it remains much the same as it was following Pearl Harbor.

Progression of the late war saw established high rates of production scuttled by manpower shortages, and material availability was rigidly controlled. Engineers and scientists bent their heads together, devising methods whereby industry could stretch still further the remaining balance of available manpower and materials.

Present day shortages, relative or actual, of labor and material are accused of handicapping industrial progress. In addition, and in keeping with the times, material costs as well as labor rates have advanced; and, generally speaking, efficient production still presents a challenge to the genius of topside management, as well as to the pride of every production worker.

The findings of the observer responsible for the editorial, "Big Surprise at Big Plant", appearing on pages 126 and 129 of September issue of this magazine, might be the result of indifference by part or all of the organization in the establishment inspected. Inefficiencies in the finishing room seemed to be equally as numerous in other departments.

The general conditions there appear to be similar to those I found in a midwestern plant where, in spite of such outstanding inefficiencies, a substantial decrease in unit cost was made. *The start of the big clean-up in the finishing room was only the beginning.*

Rejects Were Excessive on Conveyor Spray Line

Looking to the finishing room for improved efficiency it was first found that the automatic spray conveyor line, with a capacity of 1200 units an hour, was spending 25% of its time rehabilitating finish rejects. The finishing line proper, consisting of an automatic sprayer with chain conveyor through a drying tunnel, was manned by a foreman finisher and two helpers. The foreman was responsible for the mixing and application of the finish, as well as for the routine maintenance of the finishing line.

Frequently, between the first and second hour of each shift, the finishing line had to be shut down. *No provision had ever been made to arrange for an uninterrupted supply of pre-*

pared material, before the shift started work. When the spray line stopped, the sub-assembly line naturally sustained lost time too. By granting the finishing foreman and his first helper one hour or 1½-hours of overtime before the shift started, an overall saving of 20 man-hours per shift was effected for the finishing and sub-assembly lines.

Other "Bulls" I Found in Finishing Room

There were many other "bulls" roaming within the boundaries of this line. For instance, the finishing materials were mixed by rule of thumb proportions rather than to a controlled viscosity after reduction with thinner. Many stoppages of short duration were caused by: 1) a seeming lack of respect for such fundamentals as properly controlled relationship between container and spraying pressures; 2) maladjustments of the spray guns, later traced to parts so severely worn that the guns had to be rebuilt from new replacement parts; 3) burned-out electrical heating units in the drying tunnel; and 4) thermal controls out of adjustment.

The share of unit cost reduction obtained by correcting these inefficiencies could not be measured tangibly. In the course of two months time the cost records indicated that progress was being made.

Perfection seemed to have been realized at last, only to be smeared with field complaints that the paint coating was defective. Many units going over the retail counter were unsalable because of rust spots. The cause of rusting was traced finally to contamination of the finish by moisture condensation in the compressed air system, in addition to drops of condensed water falling from overhead pipe lines on the work during a pre-assembly operation.

Despite noticeable improvements on the finishing line the jinx bird still seemed to be hovering over the roof of this establishment. Overall output, in terms of salable units, seemed to be far below what was considered to be a proper figure. Rejects on the finishing line had leveled off to a virtual zero figure. The foreman finisher felt justly proud of his accomplishment and fortified his achievement by arbitrarily setting aside any units which, in his judgment, would reflect poor quality workmanship. He had found that certain surface defects in the metallic unit were magnified after the first coat of white finish was put on.

Rejects Practically Eliminated; Trained "Inspector-Operators"

By training his helpers to become inspector-operators, only perfect units were placed on the conveyor line spindles. At the end of the line the second operator removed any units which, after the first coat, reflected even a bare possibility of being classed as a final finish reject if a second coat should be applied. Such disciplining put the finishing line in the enviable position of having reached an efficiency or productivity rating of the proverbial 99.44%.

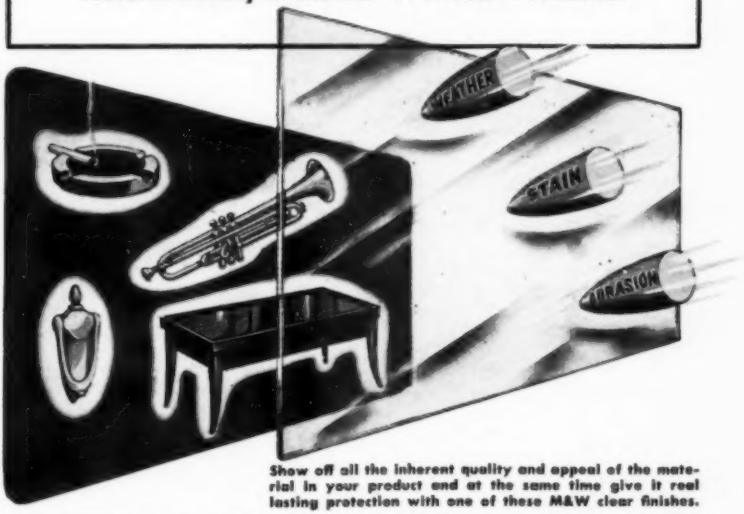
The question now was no longer how or what to do with rejects of finished products, but rather what to do with the increasing number of units that were backing up to preceding operations. Taking the cue from the finishing line, the spotlight was played on all sections of production involved in the pre-assembly operations. The idea of making inspector-operators at key points soon caught on, not only in pre-assembly but also in sub-assembly operations.

From an overall standpoint the case history discloses that on a production schedule of 65,000 to 75,000 units, as compared with 275,000 to 295,000 at peak season, a unit cost saving of 13% was made.

During the period that emphasis had been placed on quality and eco-

LIKE BULLET-PROOF PLATE GLASS

M&W's Clear Finishes Reveal and Protect the Natural Beauty of Metals . . . Wood . . . Plastics



Show off all the inherent quality and appeal of the material in your product and at the same time give it real lasting protection with one of these M&W clear finishes.

CLEAR SYNTHETICS that can be flash-baked, slow-baked, air-dried—in fact formulated for practically any finishing schedule—are available for wood, metals or plastics. They enhance the natural surface beauty of a product . . . form a transparent, haze-free film that is flexible, tough, resistant to weather, heat, stains and abrasions. Suitable for spray, dip or brush application.

CLEAR LACQUERS of M&W are well known for their uniform water-whiteness and unusually good adhesion even to metals ordinarily considered difficult to finish. They dry out of dust in a few minutes...harden throughout in one hour. With M&W clear lacquers, polished metals retain natural color and brilliance...take on lasting protection against stains, corrosion, weather, cold, heat—even cigarette burns. Suitable for spray, dip or brush applications.

By letting us help you choose the right clear finish for your product, chances are we can save you time, expense and experimentation. Just contact your nearest M&W representative or write directly to any of the offices listed below.

PIONEERS IN PROTECTION
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. . . where industry goes with finishing problems

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PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

nomical production, two things were added which worked against lowered costs. Originally the unit was finished with one coat of red as compared with two coats of white; and the unit was wrapped in cellophane—an added operation which, at the time, had to be performed manually. A breakdown of the total unit cost disclosed that direct labor was increased 21%, which was accounted for by the setup of inspector-operators and the manually applied cellophane wrapping. The material cost for the unit, however, was decreased 55½%.

In these days of high material costs and uncertain material availability, such a decrease reduces the corporate burden in inventory stocks by a considerable amount, and certainly saves the purchasing department many telephone calls to get quick delivery of needed materials.

Improvement Started in and Spread from Finishing Room

To the finisher as well as to the finish conscious production executive, it is of interest to note that *improved plant efficiency started in the finishing room*, which takes many raps (justly or unjustly) for inefficiencies of other manufacturing departments —and there are few fabricated articles that do not have a finish of some kind. To the fabricated article the finish is like a cellophane wrapping. It provides decorative or eye appeal and otherwise protects the article wrapped within it. A defective cellophane wraping can be easily replaced; it has little if any intrinsic value. A finish reject, however, carries with it the stigma not only of irretrievable labor cost but also the added burden of lost material cost in salvaging or rehabilitating the unit.

In a small custom service shop the consequences of such defects are not far reaching in their effect. In mass production, geared to repetitive fast-moving operations, the reject may be multiplied a hundred fold or more before the causes can be eliminated. In some instances a finish can hide some underlying workmanship defects, but generally excellence in finishing workmanship calls for the maintenance of high standards in other operations that enter into the manufacture of an article.

In the case history taken from the midwestern plant, two outstanding factors seem to have been developed. *First, a well routined and disciplined finishing line minimized rejects in that department. The second factor is that by establishing standards for the suitability of the work to receive a finish coat, other production departments were required to "get on the ball".* The extent to which the same approach can be successfully employed in other plants will vary.

M. & W. Christmas Party

Preparations are being made for 150 people at the annual Employees' Christmas Party of the Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N.J.

G. Klinkenstein, Vice President of the company, will anounce the addition of three more employees to the membership roster of the company's "25-Year Club". Presentation of a 25-Year Gold Service Pin and gold wrist watch will go to Mr. Nicholas Garragher, Mr. Thomas B. Haddow, and Mr. Ferruccio Olivieri.

This brings the total number of living members of that club to 21, and, in addition there are two living members of the "50-Year Club".

T. E. Deans is Advancd by The Glidden Co.

Thomas E. Deans has been appointed regional director of the Minneapolis Division of the Glidden Co. of Cleveland, Ohio. Mr. Deans started with the Glidden Co. in 1925, in the stock department, served in the advertising department, and later became a salesman in the trade sales division of the company. He enlisted in the Army in 1943 and served with distinction, then rejoined Glidden in 1945 as sales manager for the St. Louis Div'n.

The region Mr. Deans now heads includes all of Minnesota, the Dakotas and Montana and sections of Iowa, Wisconsin and Michigan.

Standard FINISHES for Every Purpose

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Household Appliances
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Four score years' experience plus the most modern of technical facilities is your insurance of uniform top quality and service in STANDARD Finishes.

Again and again, STANDARD has developed a formula that meets specific needs far better than anything previously used.

As an independent leader in the industry we invite you to consult us on ANY protective coating problem.

STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK — CHICAGO

Finishing is of vital importance here. It includes the cleaning of all metal surfaces, Bonderizing, rinsing, drying, prime coating, spot puttying, sanding, second priming, graining, top coating, baking top coats, decalcomanias.

Finishing

By M. W. St. JOHN Job Foreman of Enameling Department

CHANGES IN the styling and decoration of store fixtures produced demands for new finishes on all-metal cash registers. While grained reproductions of oak and mahogany in natural colors are still popular, requests for special finishes to match new and modernized store interiors are rapidly increasing. For example, many store designers are using various fancy woods in blond finishes—so The National Cash Register Co. is obliged to produce finished cash registers that harmonize effectively with these new interiors. All of these conditions have added something to the problems of finishing new all-metal cash registers.

Cleaning; Bonderizing; Rinse; Chromic Acid Dip

All metal register shells and parts receive the same surface preparation before any prime coating is put on. After fabrication, the metal shells are ground and polished on our third floor. They are hung on an overhead conveyor which carries them to the finishing room on the fourth floor.

First, the "shell" is suspended from the conveyor and immediately following it are all of its component parts. Accompanying each lot of four, six or eight shells and their parts, is a work order which designates the finish required. This work order is placed in

View inside conveyorized convection oven where synthetic enamel coats are baked.

NATIONAL

CASH REGISTERS

an asbestos-lined flat metal box which has a tight fitting hinged lid. The box is hung to the conveyor and travels along with the work through spray booths, ovens and various work stations until the lot is completely finished and ready for assembly.

Specifications for color, finish and process are posted in each spray booth, and contain specific information relative to the application of the various finishes. The rate of conveyor travel through surface preparation and wood-grain finishing is 3-ft. 9-in. per minute.

Arriving on the fourth floor finishing room, the metal parts enter a spray Bonderizing unit which is equipped throughout with spray heads on four sides. First, an emulsion cleaner is sprayed at 150° F. This is followed by two hot-water rinses at the same temperature. Next, a Bonderizing solution heated to 130° F. is applied. This is followed by a cold water rinse. To further prepare these metal surfaces for prime coating, the parts are sprayed with a mild chromic acid solution, and then oven dried at 210° to 225° F. Parts traveling by conveyor cool for ten minutes before they arrive at any coating station.

Prime Coat; Spot Putty; Second Prime Coat

Four prime coat colors—grey, black, walnut and brown mahogany—are our standard finishes. Of course, many special colors are necessary and are used to meet customer requirements.

The clean dry metal parts receive their first prime coat of synthetic material in a color indicated by a key letter chalk-marked on the outside of the job order box. The prime coat is baked in an infra-red oven for eight minutes at 350° to 370° F.

At this point the shells and parts are removed from the conveyor, inspected and spot-puttied where necessary. The specific lots (shells and their respective parts) are still kept together during this operation. This station is also the distribution point for the three types of finish—wood grain, smooth enamel, and wrinkle finish.

A second prime coat of the same material is applied after the spot putty operation. The second prime coat is baked in a convection oven for one hour at 300° F.

The shells (and their component parts) which are to receive a wood grain finish, are hand sanded with No. 180 sandpaper. This dry sanding is performed with special care and technique. Each surface of the main shell, as well as each separate part, is sanded with strokes running in the same direction as the wood grain which is to be applied later. Therefore any slight sanding scratches that may remain will not be visible on the surface of the finished cash register. All pieces are "blown clean" and tack-ragged before they are hung on a second overhead conveyor which carries them to the graining room.

Wood Grain Reproduction Over Metal Surfaces

As shells are removed from the conveyor for graining, the front panels are placed on a wood form and all cut-out panels are dropped into their respective places on the jig so that the entire front will receive its wood graining in one operation. This insures a perfect matching of the graining figure and color.

Reproduction of wood grain is by the etched copper plate and roller method. The etched copper graining plate is mounted in a flat level position on a metal frame which carries an automatic inking device. After the graining ink is picked up by a hand roller, pressure on a pedal starts the mechanism which re-inks the plate; excess ink is removed by a squeegee scraper blade, leaving the inked plate ready for the next impression. *(To page 66)*

Two 2000-lb. rack-loads of enamel-sprayed metal parts are baked every two hours by each of these four DESPATCH Ovens. Racks are either mounted on floor trucks or suspended from a monorail conveyor. Note heaters mounted on platform above each oven to save floor space.

LOADING

DUAL LOADING *Speeds* FINISH BAKING

DESPATCH OVENS

UNLOADING

SPEED is the keynote of this finishing department for baking sprayed enamel on metal parts. *Speedy loading* with hand trucks or suspended from a monorail conveyor . . . *speedy baking* with four large, direct gas fired DESPATCH Finish Baking Ovens.

Equipped with a 750,000 BTU DESPATCH heater mounted on platform above, each oven bakes two 2000-lb. loads at temperatures up to 500° F. Baking time averages about one hour for each truck. For maximum flexibility in handling various sized parts and meeting different baking requirements, each oven operates as an independent unit.

Baking quality, efficiency and economy are achieved with forced convection heat, 60% recirculation of heated air and positive exhaust of solvent fumes. Oven panels have 5" Rockwool insulation and telescopic joints to permit expansion and contraction.

DESPATCH *Advantages*

●INCREASED PRODUCTION. 100% convection heat and 60% recirculated air gives you speedy warm-up, fast heat recovery after re-loading and fast baking.

●QUALITY BAKING. Heavy-duty, hi-volume fans give speedy heat transfer, assure uniform baking. Equipped with automatic temperature controls and fire underwriters' approved safety system.

●EFFICIENT OPERATION. DESPATCH direct gas fired heaters cut fuel costs . . . dual loading saves time and labor . . . compactness saves floorspace. Can be built with indirect oil heaters.

WRITE TODAY for Bulletin E-51.

DESPATCH OVEN CO.

Minneapolis Office: 619 S. E. 8th Street

Chicago Office: 221 N. LaSalle Street

DESPATCH OVEN COMPANY

Hand rollers from 1½-in. to 10-in. in diameter are used. In addition, various shapes and designs of rolls and pads are available for graining the product to assure a perfectly matched uniform graining job.

Cleaning and Drying the Graining Rollers

After transfer of the wood grain to a metal surface, the hand roller is quickly washed in naphtha and dried. A roller washing machine operates continuously. Washing is done by holding the hand roller in contact with two rollers which rotate in naphtha; then the roller is held between two cloth-belted rollers between which air is forced to assure rapid drying.

The graining rolls and pads are of such gelatinous composition that care must be taken to avoid the use of any force in turning or backing up these rolls in process of drying; otherwise their surfaces may become rough, which condition will cause a faulty impression and an imperfect transfer of the graining pattern in ink.

The finishing room must be clean, with all intake air carefully filtered. Dust and dirty conditions will cause "fleas" on the finished work and this spells trouble in any finishing room.

Years ago plain mahogany and oak graining plates were about all that were needed. Now, however, many different plates are required to reproduce the natural grain effects on other fine cabinet woods to match modern store interiors.

We have added a color mixing room where colors are blended to reproduce bleached finishes and special color samples furnished by customers. These "special finishes" call for extra work and skill, but we assume that the customer knows what he wants and we must be tooled up to satisfy him. Finishes are matched with submitted samples. These samples can be anything from a piece of cloth or paper to a finished wood panel.

Clear Synthetic Top Coat Is Baked at 300° F.

After completion of the graining job the cash register shells, together with their parts, are hung on a conveyor which moves through an infrared oven where the graining color is dried five minutes at 325° F. An interval of ten minutes is allowed for cooling. Then the parts are lightly scuff-sanded (again using strokes with the direction of the grain) with fine sandpaper, and tack ragged.

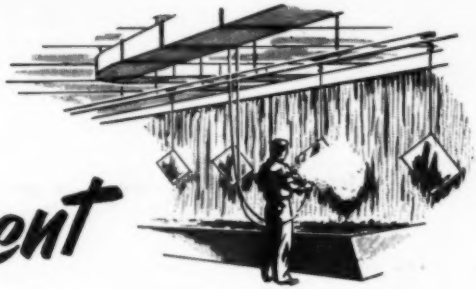
The final finish consists of a double spray coat of clear and semi-gloss synthetic material. This clear top coat is sprayed at 40 to 45 seconds viscosity (No. 7 viscosity cup) and at a temperature of 77° F. Air pressure in the pressure container is maintained at 8 to 10-lbs. while at the spray gun it is close to 80-lbs.

A conveyor then carries pieces into a convection oven where the top coats are cured for one hour at 300° F. A 10-minute cooling period is allowed before they reach the station where the name and insignia decals are put on. These are special decals which require no protective coating.

Editors Note: This is the first of two articles by Mr. St. John. In the second, which will appear in a future issue, he explains methods and procedures for applying smooth enamel and wrinkle finishes on cash registers.

New Industrial and Maintenance General Purpose Coating

"Vinyl-Clad" is the name of a protective coating material that may be air dried or baked, and which can be applied with excellent results to several kinds of metals, wood, concrete, linoleum, wallboard, tile, canvas and many types of molded plastics. The material can be applied by brushing, spraying or dipping. The cured coating is tough and highly resistant to acids and alkalis—and it doesn't chip. It is available in clear and several colors. The manufacturer is Plastics Lining Corp., 914 S. Wabash Ave., Chicago 5, Ill.



Prevent

Over-Sprayed Paint from Building Up in Your Waterwash Spray Booth

YOU CAN PREVENT over-sprayed paint, lacquer or enamel from coating spray booth back plates by adding a specialized Oakite material to the tank of your recirculating water system. Method is easy . . . material is economical . . . results cut paint costs.

The exceptional oil-removing properties of Oakite materials designed for this work condition water so that paint does not adhere to plates. Recirculating pump and lines are kept free and clean. Paint reclamation is easier, more profitable.

Ask the Oakite Man!

Your nearby Oakite Technical Service Representative will gladly give free details, help you prepare a solution. Ask him, too, about available Oakite materials for quick, complete stripping of paint pails, mixers, spraying equipment and tanks. His services are free for the asking. Arrange for them TODAY!

OAKITE PRODUCTS, INC., 32F Thames St., NEW YORK 6, N.Y.
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MATERIALS
METHODS
SERVICE

Specialized Industrial Cleaning

Painting Aluminum

THERE IS JUST one problem in painting aluminum — making the paint stick. However, this problem is not exclusive with aluminum; the same factors are encountered in painting any metal.

The difficulty in making paint stick to aluminum comes from the basic fact that metals have no open pores to mechanically key or lock the paint coating to the surface of the metal. That means the paint must adhere to a smooth surface.

There are several things than can be done to make paint stick to aluminum; First, the surface must be made perfectly clean mechanically and chemically, so the paint can get a chance to adhere to the metal itself.

Second, the surface of the aluminum can be treated to make it easier for the paint film to adhere. In other words, it can be etched slightly to enable the paint to get a grip on the metal.

Third, the primer (first coat of paint) can be selected for its adhering qualities. Some paints stick to aluminum better than others.

Right here it should be emphasized that it is not difficult to make paint stick to aluminum if even the most fundamental consideration be given the above three requirements. Most important of the three is the first—cleaning. No paint can be expected to stick when it is separated from the metal surface by a film of oil or dirt.

The second factor—treatment of the aluminum surface—is not so important where a suitable paint is applied over a clean surface. However, it is always recommended wherever one wishes the best paint job.

The manufacturer can obtain proper cleaning on a high production basis by passing the work through either a continuous conveyor type alkaline washer, or a vapor type degreaser. Then the aluminum surfaces can be treated by spraying or dipping, using a material that will apply an insoluble phosphate coating, such as Bonderite 170.

Sometimes the phosphatizing treatment can be eliminated where a first class aluminum primer, such as zinc chromate is used because where the finishing is done in a plant that has real production control, good cleaning can be relied upon. Or the first coat can be some other primer selected because of its excellent adhesion and known performance in production finishing. Most production work is done with cleaners and finishes especially formulated to suit the production methods and service.—REYNOLDS M.C.

Random Comment on the Industrial Scene

(Continued from page 9)

other hand, purchasing agents, particularly those who use certain types of steel, such as sheet steel and strip steel, know that commitments to meet the estimated requirements of large production and sales departments must be made and orders placed far ahead.

Management is smart which requires its sales, production and purchasing departments to keep in close touch with one another—not just at irregular intervals but continuously. Smart management recognizes this, and its organization is so set up that the purchasing agent or director of purchases and his organization sits in on all production and sales planning meetings. His knowledge as to possible deliveries of materials must be listened to. Heed must be given to his advice.

The head of purchases always gets plenty of hell when the factory is short of some item that ties up production. But he will be criticized plenty when business volume moves

BLACK MAGIC

(THE BETTER OXIDE BLACK)

SUCCEEDS!

The concentrated heat of a soldering iron soon discolors most finishes. Black-Magic is used on the barrel of this iron because it overcomes that trouble.

Black-Magic overcomes many finishing troubles. It is an effective protection against heat, corrosion, perspiration, gas fumes; and its deep, rich black greatly improves an article's appearance. Because of these qualities, Black-Magic is ideal for stove parts, appliances, tools, cutlery, arms—wherever salability and service life are important. Black-Magic is not a coating; actual penetration is .0001". It is very flexible. Products may be formed after processing—often a big advantage. It is also a fine bond for paint and lacquer. Chemical reaction at 300° F. For iron and all steels except stainless. There are also Black-Magic baths for zinc, copper, brass and cadmium. Simple to set up, easy to work. Send for samples and data.

SILCO a glass-base, sprayed-on protective and beautifying finish for steel and brass products. In all colors. Write for samples.

MITCHELL-BRADFORD CHEMICAL COMPANY

MODERN METAL FINISHES

2446 P MAIN ST., (Stratford) BRIDGEPORT, CONN.

CHICAGO OFFICE: 111 W. Jackson Blvd.

BLACK-MAGIC OXIDE BLACKING SALTS
WITCH-DIP & WITCH-OIL FINAL FINISHES

SILCO Glass-Base PROTECTIVE COATING
HEAT TREATING SALTS. CLEANERS. ETC.

NEW JERSEY: Lacquer Finishing Co., Inc., Clifton, N. J.—C. D. Hamilton, Fayetteville, N. Y. —CLEVELAND: Universal Paint & Varnish Co.—PHILA.: Albert Printz, Germantown—ST. LOUIS: G. S. Robins & Co.—DALLAS, Tex.: Texokana Supply Co.—DETROIT: The Danell Co.—MILW.: A. B. Plating Supply Co.—LOS ANGELES: Barber-Webb Co.—OAKLAND: Geo. A. Kushman Co.

down and the firm is caught with a large inventory.

It is important, therefore, for executives and heads of all departments of a manufacturing firm to keep in close touch with what is going on within their industry and within their own organization. These are days of extreme uncertainty, chiefly because the natural laws of economics, which make future developments reasonably predictable, are so frequently interfered with and misdirected by political accidents, political expediency and political unfaithfulness.

* * *

More Building in 1948. F. W. Dodge Corp., a fact-finding organization for the construction industry, estimates a 7% gain in construction contracts in 1948 over the actual volume reported for this year in the 37 states east of the Rocky Mountains. The total amount estimated for next year is over $8 billion.

In its annual statement, prepared as a guide to construction industry executives in establishing production and marketing quotas for the coming year, the Dodge Corp. estimates a 9% gain in non-residential construction, a 4% gain in residential contract letting, and a 7% gain in heavy engineering works over the 1947 record. The largest percentage of gains in the major construction classifications next year are expected in hospital and institutional building.

The Dodge Corp. expects a dollar volume of single-family and 2-family residential structures to exceed this year's record by 1%, with a 14% gain in apartment house awards.

The only major classification for which a decline is expected next year is in manufacturing buildings, for which a drop of 14% is estimated.

* * *

Plastic Lined Pipe. As a result of several years' research, the Amercoat Division of American Pipe & Construction Co., Los Angeles, has developed plastic-lined steel pipe to permit the handling of strong chemicals. Plastic-lined steel pipe combines the structural strength of steel with the well known chemical resistance of Vinyl resins, and permits handling strong chemicals in ordinary steel pipe.

In producing plastic-lined pipe, Vinyl resins are compounded with the proper chemical resistant pigments and plasticizers and are then extruded in the form of a tube. This tube has a wall thickness of .05 to .06-in. The plastic tube is then placed inside steel pipe and bonded to it by a special process. The tube is flared out over the flanges, providing a continuous chemically-resistant liner throughout the entire piping system.

Ferro Opens Chicago Office

The Ferro Enamel Corp., Cleveland, Ohio, announces the opening of new offices located at 336-338 N. Central Ave., Chicago, Ill.

Mr. G. W. "Jerry" Hofstetter, Ferro's Midwest Sales and Service Manager, will make his headquarters at the new location. The new offices will serve Ferro customers in the porcelain enamel, pottery, synthetic finishing and allied fields —offering finishes, equipment and special services for the entire Chicago territory.

Jerry Hofstetter, Ferro's Midwest Sales & Service Manager, with headquarters in Chicago, Illinois.

Opening of the Chicago office is a part of Ferro's post-war expansion program which now includes new branch offices in New York, Detroit and St. Louis, and new manufacturing plants in Nashville, Tenn. and San Francisco, Calif.

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THEORY AND PRACTICE OF *Furniture Finishing*

By ROLLIN H. WAMPLER

Author's Note: In this series of articles I shall confine my discussion to finishing wood furniture. Only about 5% of all furniture produced in this country is made of metal, while 90% is of wood, and the finishing techniques are quite different.

DID YOU EVER consider why wood furniture is finished at all? Any given piece may be subjected to a dozen or more separate finishing operations before it is boxed or crated. It may be enlightening to consider some of the reasons for this expenditure of labor and materials.

I shall discuss briefly four major reasons for finishing wood furiture, namely for decoration, protection, sanitation and economic reasons.

Why Furniture Is Finished; For Decoration and . . .

The decorative functions of wood finishes are well understood. Wood is a friendly material, warm to the touch, and its true beauty can be presented most effectively by suitable uniforming stains and clear surface coatings.

Furniture should be ornamental as well as utilitarian. That is the reason why rare and beautiful woods are sought the world over for making fine furniture. The full beauty of the natural figure in these woods can be developed only by the skilled finisher's craftsmanship.

Finish Gives Protection Against Harmful Effects of Moisture

The more prosaic function of wood finishes, protection, must be well understood by furniture finishers if they are to realize the success their labors deserve. It is obvious that surface finishes protect the wood from abrasion, chemical damage, staining, soiling, and discoloration. But do you realize the role they play in protecting the structural integrity of furniture?

It is surprising that the most important protective effect of wood finishes is the least understood. If a solid board, clamped securely so that it cannot expand in thickness and width, is saturated with water, tremendous stresses are set up. It is well understood that wood expands when it absorbs moisture. This expansion is negligible lengthwise of the grain, but it may be 10% or 15% across the grain. Since the board in our illustration cannot expand in thickness or width, and yet the saturated cell walls have swollen, the result is deformation of the shape of the cells and pores. They become

Checkerboard Champ . . .

The Mediterranean flat-fish is the chameleon of the sea, changing color to match its background. One experimenter even got the flat-fish to imitate a checkerboard, by placing it on black and white squares! The versatile flat-fish works this trick by shifting loose grains of pigment around under his skin.

For a versatile answer to industrial surface coating problems, think of lacquer. Lacquer is the finish that's easy to apply, durable, attractive, fast drying. Your supplier would like to tell you about lacquer in more detail.

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flattened, so that the air space in the wood is somewhat less than before, at the fiber saturation point.

Now if the wet board is dried out in the clamps, the cells and pores will not regain their normal size and shape; they remain flattened. Result: the board shrinks; it becomes narrower, when dry, than it was originally. In other words, it shrinks as usual in drying, but with the clamped width as the starting "green dimenson." The process may be repeated many times, the board becoming narrower and narrower at each cycle.

This phenomenon has been called compression-shrinkage. It explains why axe and hammer handles become loose when they get wet and then dry out. No amount of wedging will prevent it. It explains also why tight wood kegs and barrels shrink some in circumference after they become wet and then dry out; then the hoops must be driven on tighter. Similarily, compression-shrinkage explains how nails and screws become loose in wood structures, indoors as well as out.

How Moisture and Humidity Damage Unprotected Furniture

Applied to furniture, if initial stresses produced by contact with water or by high humidity do not loosen the fastenings or glue joints, cracks will appear at the joints when the wood loses some of its excess moisture. In extreme cases the boards may split. Even well-made plywood, assembled with waterproof glue, may open at the joints, although there is less danger than in the case of all-solid construction. While no ordinary wood finish will exclude moisture indefinitely, any reliable finish will exclude liquid moisture and retard the entrance vapor (humidity) to the extent and degree required for household furniture.

By promoting dimensional stability and preventing or minimizing compression-shrinkage, furniture finishes serve to prolong the useful life of furniture.

Non-water-resistant glues will give much better service indoors when given protection from moisture, to the extent that most furniture finishes afford. That is why the cassava flour and other non-waterproof vegetable glues formerly used so widely in furniture plywood gave good service.

Compression-shrinkage also explains some of the other failures in unfinished wood furniture. It is responsible for cracking, some types of checking, cupping and warping. If you will wet a spot on a wide board and let it dry, fine cracks are quite likely to appear in the spot. If they do not appear after the first cycle, they will appear if the process is repeated a few times. Each time the cracks become larger, and finally there is no way the damage can be repaired except by patching.

Cracking, Checking, Shrinkage . . . Results of Excessive Moisture

What happens is that the wet area in the board cannot expand; so it shrinks upon drying, causing cracks to appear. Prevention of this type of cracking and checking is an important function of finishes for furniture—especially furniture upon which water may be spilled occasionally.

Cupping results if one side of a board is wetted. Since the mass of wood and its fastenings prevent normal expansion, compression-shrinkage causes the wetted side to become cupped when the water evaporates. Warping occurs in a similar manner. This working of the wood not only produces an unsightly appearance, but also tends to pull the fastenings loose.

For compression-shrinkage to occur the wood does not have to be actually moistened with water. Exposure to high humidity, which may often occur in the average home, produces the same effect. *(To page 80)*

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Finished Furniture is Easy to Clean, and More Attractive

The third function of furniture finishes—sanitation and cleanliness—is well understood. Unfinished wood collects and holds dirt. Because of its porous nature, dirt, grease and bacteria become imbedded in the wood and are difficult to dislodge by any means. A well finished wood surface, on the other hand, is easy to clean.

The fourth reason for finishing furniture—the economic reason—is well understood by furniture manufacturers. The economic value and saleability of a beautifully finished piece of furniture are increased far out of proportion to the cost of finishing. Because the furniture manufacturer can realize a substantial profit on the finishing cost, practically all furniture is finished in the factory.

Furniture Finishes Will Not Hide Defects in the Wood

Before going further, I must point out one thing which furniture finishes will not do, contrary to popular opinion. This limitation applies to clear finishes, with which practically all furniture is coated, and not so much to enamel (solid-hiding) or semi-hiding finishes.

No clear finish will hide or obscure surface defects or irregularities in the wood. Clear finishes are developed and used to emphasize the natural coloring and grain patterns in fine cabinet woods. By the same token, they will also emphasize unsightly differences in texture (hard and soft bands as in Douglas fir), cross grain, sanding marks, dents, and other surface irregularities. This means the wood must be carefully selected and then made perfectly smooth.

Coarse sanding marks and scratches may not be visible until stain is applied. The stain will penetrate deeply into the torn fibers and end grain along the sides of the grooves made by coarse sandpaper, with the result that the beautiful wood pattern may be spoiled by a series of dark parallel lines. Stroke sanding and belt sanding should always be done with the grain of the wood. Final belt sanding should be performed with No. 4/0 to No. 6/0 sandpaper.

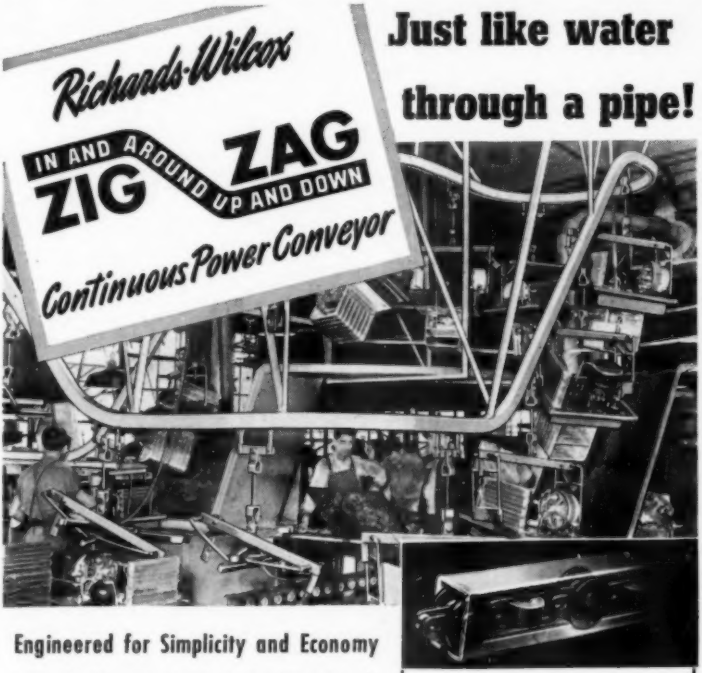
Wood fillers and sanding sealers are used to fill and smooth out unavoidable irregularities, but even these materials have their limitations. When you pause to consider that a furniture finish may be only 0.001 to 0.003-in. thick, the futility of attempting to fill scratches and dents with the finish is at once apparent. To attempt it by applying many coats, sanding between coats and rubbing the final coat, would be an unnecessarily long and expensive job. It is far more practical to have the wood in proper condition first.

When wood furniture is fabricated and finished, it should have the same amount of moisture as it will have in normal service. The normal moisture content of wood furniture in service is 6% to 8% on a dry weight basis, therefore the lumber should be kiln dried to this range before it is fabricated and finished. In the case of furniture plywood, particular attention should be given to the possibility of excessive moisture being introduced by the liquid glue. Any skilled cabinet maker knows how to handle this problem.

Some Moisture in Wood Is a Desirable Normal Condition

Too much moisture will result in shrinkage and cracking at the joints. Too little (a condition which rarely occurs) may also result in cracking and failure of the joints.

As the reader may have already inferred, the main fault of wood as a structural material is its property of changing in dimensions under varying moisture conditions, due to its hygroscopic nature. Moisture is the



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greatest single factor in the deterioration of wooden structures. It follows that the moisture-excluding effectiveness of a wood finish is one of the prime measuring sticks of its value. To express it another way, a prime function of a wood finish is to keep the moisture content of wood as nearly constant and as evenly distributed as possible.

A Finish Helps to Prevent Entrance of Excessive Moisture

No ordinary finish will keep out moisture indefinitely; but on furniture, most of the reliable finishes will keep out water until it evaporates or is wiped off, and will retard the entrance or loss of moisture vapor enough to level out the fluctuations in moisture content (and dimensions) to a significant degree. It comes as a surprise to many that a sheet of celluloid 0.005-in. thick is inferior in moisture-excluding effectiveness to most furniture finishes of equal or less thickness.

Applied to furniture, there are three factors that determine the moisture-excluding effectiveness of a given finishing system.

Formulation of Finishing Material; Film Thickness

The formulation of finishing materials is a factor that has been and is being studied constantly by manufacturers, and the results are embodied in their products. Furniture manufacturers can exercise control over this factor only by selecting those materials which they believe are best.

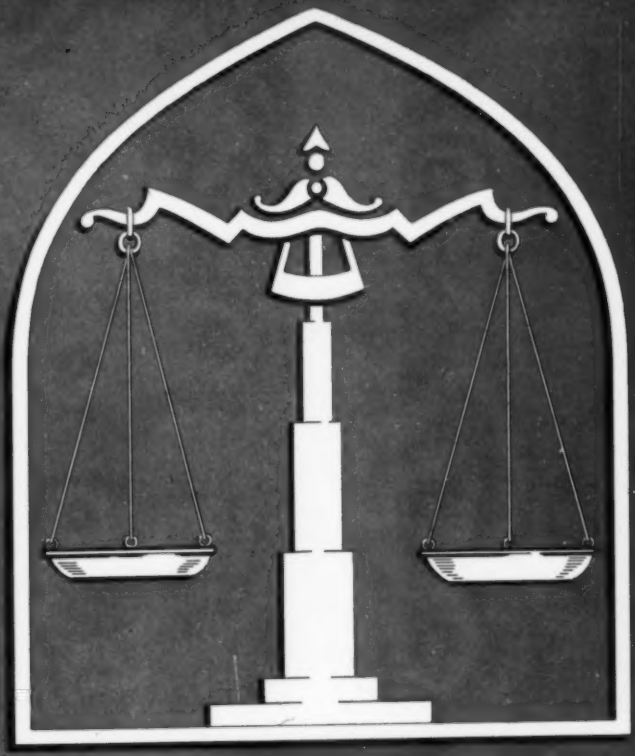
At least two coats of any surface-type material are required to produce a finish worthy of the name. Filling or saturating the surface layers of the wood is not adequate, because the "wicking" action of exposed wood fibers will draw moisture into the wood. On furniture, for example, tests have shown that at least 0.001-in. film thickness (after rubbing) is required for adequate protection. Actual dry film thickness and not the number of coats is the important factor. At the present state of the art and technology of wood finishing, this means a coat of sealer and at least one topcoat. Two or even three topcoats are better, but beyond this point the rate of increase of moisture-excluding effectiveness falls off rapidly.

What Surfaces to Coat to Keep Out Excess Moisture

Whenever possible, all surfaces should be coated. Any surface through which moisture can gain access should be coated. This is of prime importance in the case of water, and of secondary importance in the case of moisture vapor. Thus, in furniture only the exposed surfaces are likely to be exposed to water, therefore these surfaces are always finished.

In regard to exposure to high humidity, the principle is sound in theory, but in practice some compromises must be made. The general practice is to finish only the outside surfaces for reasons of economy and practicality. This compromise also has some sound theoretical basis, because all organic coatings are far more effective barriers to short exposure to water than to several days of exposure to moisture-laden air (high humidity). However, regardless of the economy of the practice, where exposure conditions are extreme it is better to finish all surfaces, because then the moisture content of the wood can be kept more nearly constant and more evenly distributed. Internal stresses are thereby reduced, so that the life and utility of the structure are increased.

I believe that at the present time the cold-crack test, properly conducted and interpreted, is a valuable means for evaluating the comparative life of two different furniture finishing systems. But there is a serious need



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for correlating the moisture-excluding effectiveness of furniture finishes with this test, as it is at present conducted. Means for doing this will be suggested in a future article, too detailed to to include in this series.

On-the-Surface Finishes Versus Penetrating Finishes

Usually, in finishing furniture—after staining and filling—every effort is made to prevent penetration of sealers and top-coats, so as to produce a film of maximum thickness with a minimum number of coats. While this practice does produce films that effectively exclude moisture, such films are susceptable to scratching, marring, and other mechanical damage.

On the other hand, finishes that lie almost wholly within the top layers of the wood have wonderful resistance to mechanical wear, but have poor moisture excluding effectiveness. In practice, the film above the wood surface should be thick enough to permit rubbing and to exclude moisture, but it should have as much toughness and mar-resistance as possible. It seems that the ideal furniture system should have both penetrating and sealing properties.

Lacquer sealer is usually recognized as the weak link in most wood finishing systems. Because the material is designed to lie on the surface (for quick drying) and to be sanded (sanding agents) it reduces the toughness and mar-resistance of the finish. By making the sealer slower-drying, so as to permit better penetration at a sacrifice of fullness or sealing properties, better toughness is secured.

Some Penetration Needed for Toughness and Adhesion

Every finisher knows that maximum toughness and adhesion is obtained by leaving off the sealer and applying the top-coats directly over the filler or stain, with a consequent sacrifice in fullness. The topcoats penetrate more and are more firmly keyed into the surface. Likewise, a filler with too much "hold-out" tends to produce a brittle finish.

Probably the most satisfactory compromise is to permit some penetration by one of several means. Using a low-solids (10% to 15%) sealer that is slow-drying, slow-setting and slow-sanding) is one of the most practical—if one cannot eliminate the sealer entirely. Selection of fillers (by trial) that give best toughness (regardless of hold-out) is another. Solvent penetration will usually key together top coats, especially lacquers.

Urea-alkyd top coats that have been fully cured by heat and then have been recoated tend to have a "shelving action"; in other words, poor adhesion between coats. Only partial curing of the first coat will remedy the trouble. Likewise, ordinary air-drying varnishes that have dried several days or more before recoating may show the same trouble unless the surface is well sanded. It is not the general practice to sand between lacquer or varnish coats in production work—only the sealer coat being sanded. If the furniture manufacturer desires to get a tougher finish, and is willing to put on an extra coat to do it, then by promoting penetration of the first coat, or coats, over the filler or stain, he can easily do it.

(To be continued)

Retires After 40 Years With Yarnall Paint Co.

At a luncheon given in honor of Joseph Shepherd, recently at the Fairfax Apartment Hotel, Philadelphia, Penna., William MacKnight, President of the Yarnall Paint Co., announced Mr. Shepherd's retirement.

Mr. Shepherd has completed 40 years of service with the company in various capacities and was currently in charge of the Accounting Department.

Mr. Shepherd had previously received a completed service pin with four diamonds at the completion of 30 years service and a gold inscribed watch at the completion of 35 years service.

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Lacquer Fumes

We operate a small lacquer department, which includes both dip room and air gun spray hoods. We have some objections by certain operators on the strong odors or fumes arising in the dip room.

We have an exhaust fan in here and we would like to know what is considered good practice so far as the volume of air changes are required in a dip room, in accordance with its size.—E. MFG. CO.

A dip room or department not designed for this operation can become the most dangerous part of an otherwise safe manufacturing plant. The reason is, we cannot see the danger. Even when it's too late and a fire has ruined everything, we still scratch our heads and wonder why.

The danger of a dip room is similar to the danger of flying. Everything operates smoothly 99 times out of 100, and would operate smoothly 100% if the pilot could see what is happening to the air currents, but not being able to see the down drafts, he never knows when one of these air movements is going to cause trouble.

In the dip room we cannot see the movement of the air laden with solvent fumes, but if we will remember that solvent fumes are heavier than air it is easy to picture the fumes of the dripping articles slowly floating toward the floor, plus the fumes from the dip tank.

Upon checking the specific gravity of the paint in the dip tank (let us say every hour for perfect dip results, and replace the solvent in the tank to obtain the same reading of the Baume gauge) the amount of solvent that must be added to the dip tank will make your head swim. The amount of solvent added plus the percentage of the coated articles is the amount of fumes hanging in the air near the floor. These fumes will explode in a flash from the smallest spark from a shoe nail scraping along the floor, or a steel push truck tapping the side of a steel post or the dip tank.

In some instances the operators become nauseated after a few hours, which shows that the fumes have become so heavy near the floor that they are beginning to fill the air higher up, until finally the operators are breathing the fume laden air. Such a condition is "dynamite".

The exhaust system for a dip room should be at floor level, not near the ceiling. If a fan is mounted near the ceiling the fresh air will be drawn through the door or opening in a straight line to the exhaust fan, cutting a passage for itself through the heavy fume-laden air. Exhaust fans or exhaust ducts, when mounted at floor level, will remove the heavy fume-laden air, reducing the hazards.

It is not advisable to place the exhaust behind storage tanks, dip tanks or any other obstruction; it should be installed in a such a position as to permit a free passage of air past the operator's walking aisle, dip tank and drain board, to prevent cross currents of air interferring with the free passage of solvent fumes.

Since the War's end I have noticed

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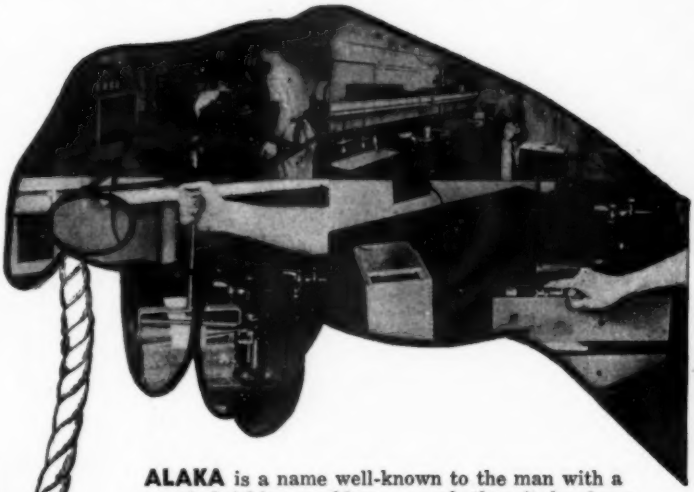

ALAKA is a name well-known to the man with a metal finishing problem . . . whether it be for a vanity case or a metal cabinet . . . a photographic instrument or a piece of electrical equipment . . . or a safety pin.

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that all new plants of large manufacturers, such as automobile plants, furniture and steel fabricating factories, are installing floor level exhaust systems in all departments that use solvents—their laboratories, paint mixing room and paint storage sheds, as well as the dipping and flow coating departments. There does not seem to be any specific size fan recommended for the size of the department, but I believe that a fan or exhaust system should be large enough to replace the air in the entire room every five minutes.—W. BEACHAM.

To Remove Thick Dry Paint From Floor

In our hand painting of window shades section, the paint and glue size builds up to an appreciable depth quite quickly on the floors. We have two problems on which we would appreciate any information you may have:

1) An economical method of removing the paint and glue size already on the floors. In some places it is to a depth of about 1-in. The floors are of concrete, but not tight enough to permit flooding.

2) Is there any coating that can be sprayed or brushed on clean concrete floors, that can be easily peeled off with the accumulation of paint and glue size every six months or so? The men wear hob nails in their shoes to prevent slipping, so it would have to withstand rough treatment.—M.C.Co.

We hesitate to suggest the use of solvents to soften this mass of packed-down paint, etc., because improper use of same might cause a serious fire, damaging or destroying your plant and perhaps injuring some of your workers.

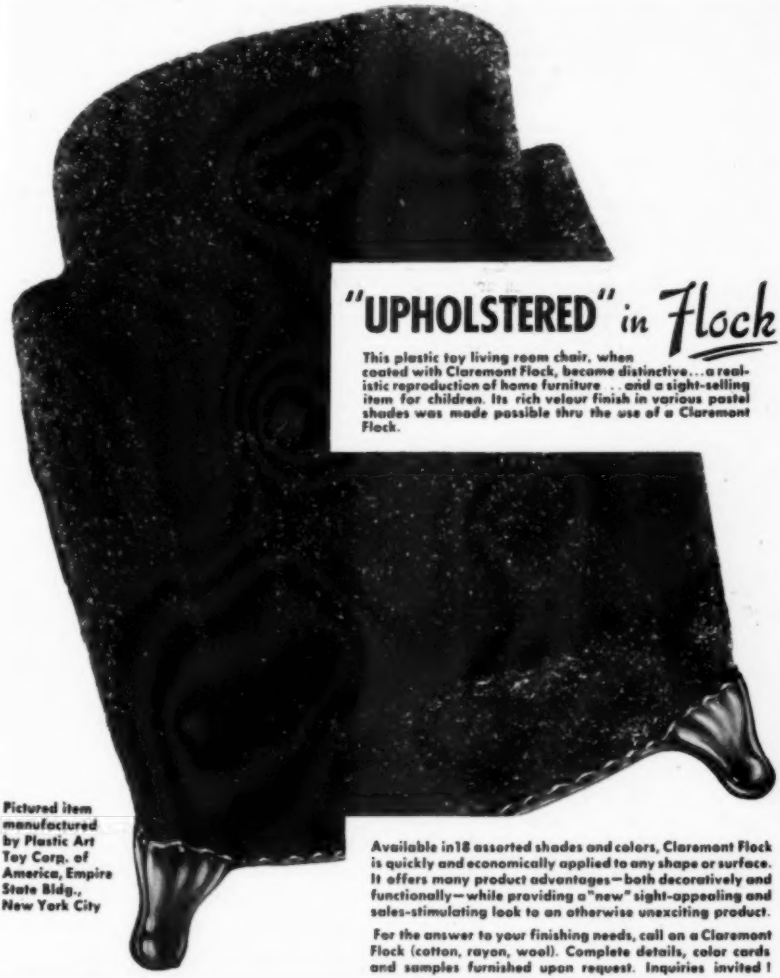
We know of one case where a situation like this existed, and the company resorted to the use of electrically driven "hammers" like air hammers—each one being fitted with a chisel at the end. Of course, this would be a rather slow laborious process, but it would be safe in that no inflammable solvents are used.

Offhand, we do not know of a safe coating or liquid that could be used in the way you mention. However, we are referring this to some of our technical men, and perhaps we will uncover some information that may help you.—ED.

Although the use of paint and varnish remover spread over the floor and allowed to soak for about 30 minutes. does present some fire hazard, it is an effective way to clean the floors, and is not dangerous if proper precautions are taken. One of the greatest hazards is from the fumes being ignited by a spark. However, if a sufficient number of windows and doors are left open, so as to permit free circulation, there is no appreciable danger.

Our experience has been to take an area of about 100-sq. ft. and thoroughly soak it with liquid paint and varnish remover. Then, after about 30 minutes, scrape the floor. Sometimes two applications are necessary. There is, of course, a possibility that in scraping the floor a spark will ignite some of the material, but we have never had any difficulty in this respect. Our workmen use only scrapers made of brass or copper, which are not so likely to produce a spark, as iron or steel scrapers. As a further safey precaution we keep a couple of fire extinguishers handy. As long as all drums or five gallon containers of paint or other combustible materials are closed, there is little danger of fire.

The second method that we use is something the Editor has just mentioned, namely, electrically driven



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hammers with a chisel at the end. This method is good when the condition of the floor is very bad. Although it is a somewhat slow process, it is effective and we use it quite widely in our plant.

A third method is to make a strong solution of caustic soda in water and spread this over the area to be cleaned; then cover the area with sawdust. This treatment permits the solution to work without the evaporation of water, and certainly does a good job of cleaning. It is somewhat slower than with the other two methods, but probably less work. About all that you have to do is to prepare the floor, as mentioned and allow it to stand over night; then, next morning, simply shovel up the loosened material.

Relative to the second paragraph of your inquiry, I know of no coating that can be applied to clean concrete floors—none that can be easily peeled off with the accumulation of paint and glue size every six months or so. Frankly, I think you are taking the wrong approach to your problem. A few minutes time spent each evening, prior to quitting time, is all that is necessary to keep the floor clean. If you will keep it clean each day, or at least each week, you will never have such an accumulation of hard dry paint on your floor. You may say that it will be too hard to do this, but in my experience I have always found that workmen who keep their bench, or working area clean, also do their regular work better. There is no substitute for good housekeeping around a paint factory, or finishing room.—RAYMOND C. ADAMS.

I know of only one way of doing this difficult job—one way that appears at all practical. First, spread a thin layer of sawdust over the deposits and keep this covering of sawdust wet with a hot solution made up in the proportion of 1-lb. of trisodium phosphate to a gallon of water. By keeping the deposits wet down over a week-end, when it will not interfere with normal work, by Monday morning the dry hard paint, etc., should be soft enough to scrape off.

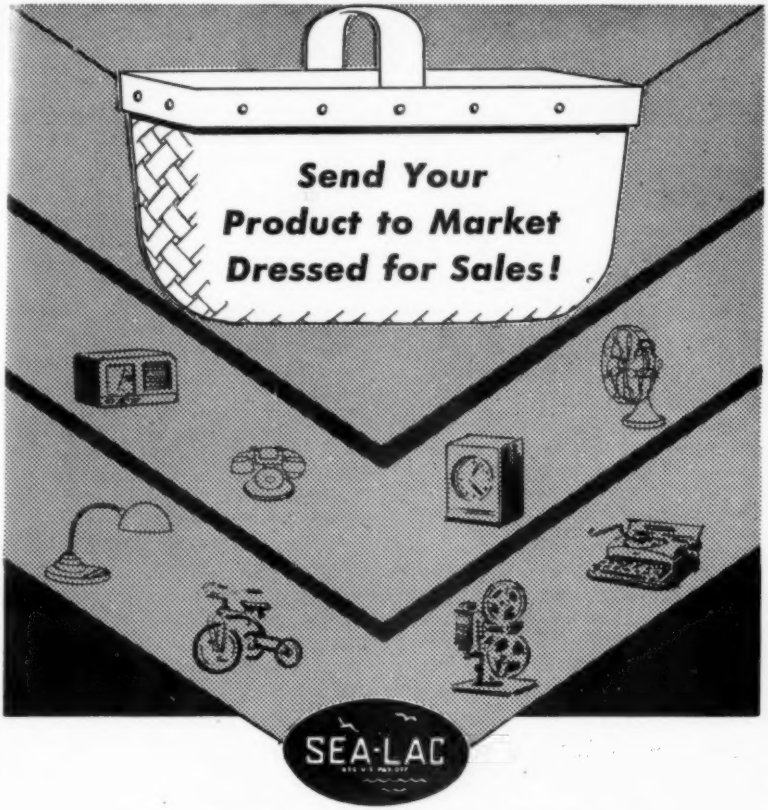
Of course, the watchmen would have to wet the area frequently with the solution to compensate for loss of water by evaporation. It will not be necessary to flood the surface; just keep it thoroughly moist. You may have to repeat the process several times before the inch-thick deposits will come off.

Caustic soda, used in this manner, will do the job but I hesitate to recommend it because it may damage the skin. Also, if it seeps through the floor it may damage equipment or supplies on the floor below. Trisodium phosphate is not so likely to cause trouble of this nature, and may do the work satisfactorily.

Referring to the second paragraph of your inquiry, ordinary peel-off coatings are too soft and tender to be used on floors. However, you may find that, in spite of damage from shoes and hand trucks, it may pay to use the peel-off coating because it does come off most surfaces, especially metal, easily. It is more difficult to remove from concrete, but still is easier to remove than paint deposits that have become hard. Try one of them on a small area first.—ROLLIN H. WAMPLER.

Prevent Stain Bleeding Into White Coat

Frequently it is our desire to refinish some of our chairs which were previously finished in an oil wiping stain, then covered with a coat of clear sealer and a top coat of clear lacquer. Sometimes we want to refinish these chairs in white enamel. Our usual process is to apply a coat



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of white undercoat and then a single application of white top coat.

In order to prevent the stain from bleeding through the white finish we have tried applying a coat of shellac right over the chair that was oil stained. This generally results in crawling of the subsequent white finish. In an attempt to stop this crawling we tried a very thin mixture of shellac, and also tried light sanding of the shellac coat before applying the white undercoat and the white top coat. We found that this latter method helped, but it is still not successful.

We wonder if you can suggest another type of sealer that can be applied over the stain finish to prevent its bleeding through?

In the past, we have attempted to strip the finish on the stained chairs before refinishing them. We used acetone for this purpose, but even then there was some bleeding of the small amount of stain that remained in the pores of the wood. Any way we feel that there must be some method that will eliminate the necessity for stripping the original finish. If we could just find the right type of sealer to use as a base, before applying our white finishes, we believe our problem would be solved.—C.N.Co.

You have a difficult problem here, but I am sure it can be solved. Aside from what you have already done, I might mention five other angles for attacking your problem.

1—It is entirely possible that you can prevent crawling of the white undercoat over the shellac by adding some mixing lacquer to your shellac. A "shellac mixing lacquer" is a special lacquer made for blending with shellac to improve the flow, drying and sealing properties.

One part of mixing lacquer blended with about two or three parts of the shellac (after it is reduced and ready for spraying) is a good starting point. Apply a thin coat, so that its sets up quickly. Thin coats have less tendency to cause bleeding because they stay wet a shorter length of time. When dry, sand lightly and apply the white undercoat and enamel.

2—Another possibility is that a very thin coat of clear lacquer applied over the shellac will prevent crawling of the undercoat. Spray on a very thin coat—just enough to give a continuous film. The solids should be about 12% or 14%. A 27% lacquer, reduced with an equal portion of lacquer thinner, should be a good starting point.

3—Sometimes aluminum bronzing lacquers will stop bleeding, due to the leafing and sealing properties of aluminum powder. Add about 1¼ to 1½ lbs. of aluminum powder or paste to one gallon of clear lacquer at 10% to 12% solids. Spray on a uniform coat. When dry, apply the white undercoat without sanding the aluminum lacquer. If you find this works, and you plan to use the method, it is best to get a special bronzing lacquer for the purpose.

4—It is possible that the undercoat will crawl over the shellac, but not the white enamel. You might try applying the shellac between the undercoat and the enamel. Apply the undercoat over the lacquer with which the chair was originally finished. It will perhaps show some bleeding. Then sand and apply a thin coat of shellac, followed by a coat of enamel. The shellac will likely prevent any stain bleeding into the enamel.

5—Another possible solution is to apply the shellac over the clear topcoat lacquer as you have done, and then soften it slightly with solvents before applying the undercoat. For this purpose try an equal parts mixture of denatured alcohol and lacquer thinner. Spray it on, and then follow immediately with the undercoat. The softening action may stop crawling of the white undercoat.—R.H.W.

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Allow YARNALL Laboratories to help you solve your finishing problems. We will gladly quote on your requirements and aid in every possible manner toward a speedy and efficient solution.
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EMBOSSING FINISHES
LUMINOUS FINISHES
WRINKLECAST
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Philadelphia
Penna.

Binks New Spray Gun

Development of a new high precision production spray gun, the Model 18, is announced by the Binks Mfg. Co., 3116 Carroll Ave., Chicago 12, Ill. The new gun handles all types of finishes. According to the manufacturer, the Model 18 gun offers a new high in spray finishing performance. Its design is based on sound experience and manufacturing know-how. It embodies the suggestions of both the engineering and finishing departments of some of the largest industries in America, where really fine finishes must be obtained at the lowest possible cost.

Attractive in appearance and performance

Controls of the Model 18 are conveniently located at the back of the gun. The spray pattern is adjustable from round to flat with all intermediate patterns. The gun body is of drop-forged aluminum with black electrolytic coating for long life surface protection. The gun head and air nozzle are tough, drop-forged bronze with exceptionally heavy plating.

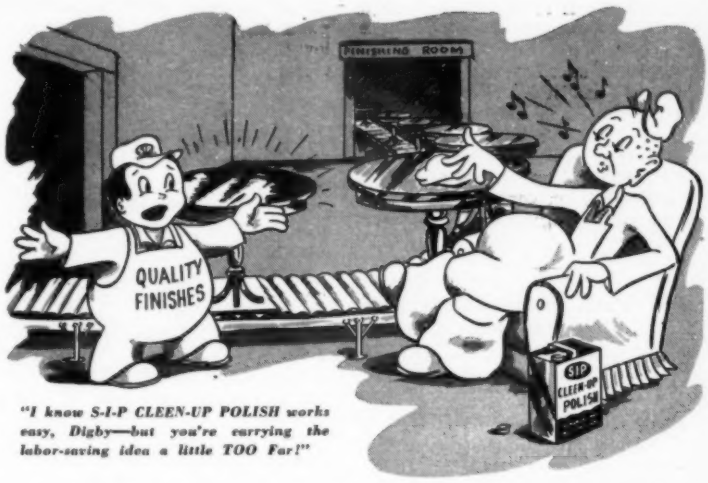
The material nozzle of the Binks Model 18 spray gun is hardened steel. A hardened steel needle valve is easily adjustable to compensate for wear. Its self-centering nozzle is designed on tapered seat principle. A cartridge type air valve is used. The comfortable 2-finger trigger is protected from wear by a hardened plate on the back. All gun parts are made of wear and corrosion-resistant materials. A large air passage through the Model 18 gun increases its efficiency. All connections are of standard pipe threads.

Carbon Monoxide Tester

Among the new safey products recently announced by Mine Safety Appliances Co., Pittsburgh 8, Penna., is the M.S.A. Carbon Monoxide Tester.

This instrument, utilizing indicator tubes developed by the National Bureau of Standards, is designed to determine the presence of deadly carbon monoxide concentrations in air.

Simple in operation, and requiring no special training to use, the M S.A. Carbon Monoxide Tester is capable of indicating the presence of carbon monoxide from 0.001 to 0.10% by volume in air. The nucleus of the instrument is a detector tube containing a yellow silica gel, impregnated with a complex silico-molybdate compound and catalyzed by means of palladium sulfate. In use, the sealed ends of the tube are broken in the convenient tube-breaker and the tube inserted into the instrument tube-holder. A



"I know S-I-P CLEEN-UP POLISH works easy, Digby—but you're carrying the labor-saving idea a little TOO Far!"

For a *Real* Labor-Saving Final Clean-Up, Use

S-I-P Cleen-Up Polish

You just "wipe it on and wipe it off"—it's as easy as that. Whisks away finger marks, rubbing compounds, dust and lint . . . like magic.

S-I-P CLEEN-UP POLISH brings out the full beauty of the finish, too—steps up sales appeal. It leaves no scum or residue—contains no harmful solvents. Made and guaranteed by the makers of the famous WEAR MASTER FINISHES.

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EVANSVILLE 4, INDIANA

sample of the air is aspirated through the tube by squeezing the bulb of the instrument.

If the air sample contains carbon monoxide when it is drawn through the tube, the yellow indicating chemical turns varying shades of green, directly proportional to the CO concentration; the degree of discoloration of the gel is then compared with the instrument's integral revolving color scale for quick and easy reading.

Portable Paint Spray Compressor

The Sharpe Mfg. Co., 1224 Wall St., Los Angeles 15, Calif., announces the Bearcat unit for portable paint spraying. This direct drive 1/3-hp. compressor has the same features of durability as the company's 1N and 2N, in piston assembly. The cubic foot displacement is 2.6, and it operates at 35-lbs. pressure.

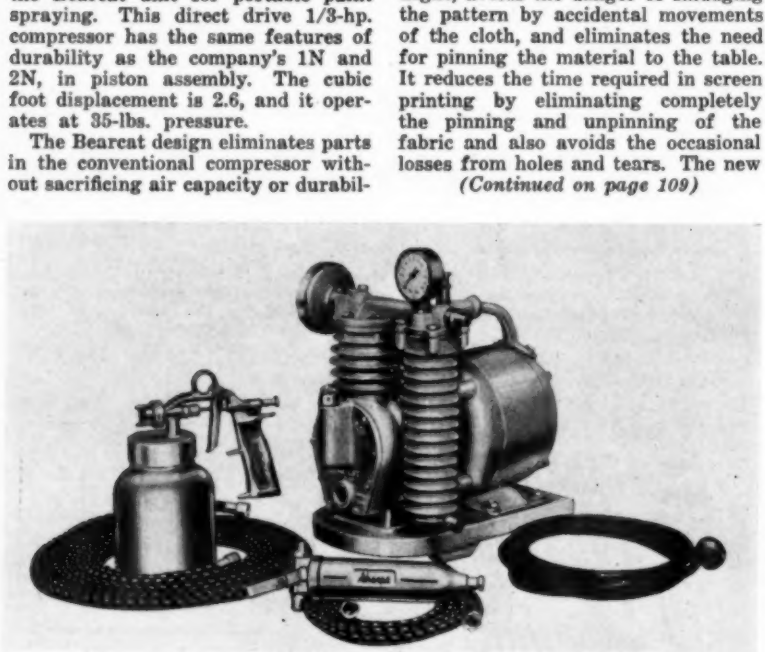
The Bearcat design eliminates parts in the conventional compressor without sacrificing air capacity or durability of the unit. With fewer working parts Sharpe assures long wear at a low maintenance cost. The unit, with motor, weighs less than 40-lbs.

Screen Printing Textiles

A new wax which has the property of holding fabrics without adhering to them has been developed for use in the screen printing of textiles. The wax, produced by Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., and Natrium, W. Va., is applied to the screen printing tables to keep the fabric from slipping during processing.

Use of the wax, called Flexo Wax C Light, avoids the danger of smudging the pattern by accidental movements of the cloth, and eliminates the need for pinning the material to the table. It reduces the time required in screen printing by eliminating completely the pinning and unpinning of the fabric and also avoids the occasional losses from holes and tears. The new

(Continued on page 109)



A compact portable outfit for frequent or occasional spray painting jobs.

method has proved superior to older methods, for pinning has never been satisfactory, except for high pile fabrics.

Flexo Wax C Light is easily applied to screen printing tables, either by hot melt or, after being mixed with a hydrocarbon solvent, in paste form. After the wax has solidified through cooling or the evaporation of the solvent, the fabric is placed on it. Slight pressure will cause the cloth to adhere to it tightly enough to prevent slipping. Yet, because of the wax's unusual properties, wax particles will not pull off or stick to the fabric when the material is peeled from the table.

Cleaning Machine Agitates and Dips the Work

The Equipment Division of the Magnus Chemical Co., Inc., Garwood, N. J., has re-designed and increased with new models, its complete line of Magnus Aja-Dip (agitates and dips the work) cleaning machines.

The outward appearance of the machine has been streamlined, with grouped control and instrument panel and attractive finish. The drive mechanism is entirely located in the front of the machine for easier access and servicing.

Positive, fast cleaning is obtained by mechanically raising and lowering the platform of dirty parts 60 times a minute up and down through the cleaning solution with an 8-in. vertical stroke. This imparts a real strong "shearing" action to the cleaning solution which actually "cuts the dirt." The vertical and fast motion of the work in the cleaning solution forces the cleaning fluid through all intricacies and recessed portions of the work, bringing new active solution into contact with the metal surfaces with every up-and-down stroke.

Parts being cleaned within this new streamlined machine are moved up and down 60 times a minute through the cleaning solution, which may be either hot or cold.

Cleaning with the Magnus Aja-Dip Machines is fully automatic, and thorough, requiring labor only for loading and unloading. The operator is freed for other duties while the Aja-Dip does the cleaning.

Magnus Aja-Dip Cleaning Machines are available in 13 sizes and types, from the Midget type handling a few pounds of work to the Jumbo type handling 2200-lbs. at a time. They may be used with either hot or cold cleaning solutions. If heated, heat may be by steam, electricity, oil, gas or kerosene.

Peel-Off Protective Coating

According to Spraylat Corp., One Park Ave., New York 16, N. Y., "Spraylat" compounds are different than the usual type of temporary protective coating compounds in that they are water dispersions of film forming materials. They do not contain volatile solvents, and accordingly, are free from any fire hazards, and any toxic condition in spraying.

The material is shipped as a liquid, adjusted before shipping for best spraying conditions. The compounds contain about 3.6 to 3.8 lbs. of dry solids or film-forming material per gallon. The coverage obtained with Spraylat depends on the thickness of the protective coating applied. For withstanding all average service, a

film thickness of .003-in. plus has proven satisfactory. This thickness of coating can be deposited with one application to obtain a coverage of 200-sq. ft. per gallon, under average spraying conditions.

When dry the film is tough, abrasive resistant, elastic, and adheres to the surface strongly, permitting all machining operations to be performed such as drawing, drilling, bending, etc., yet the film can be removed by a steady pull when desired.

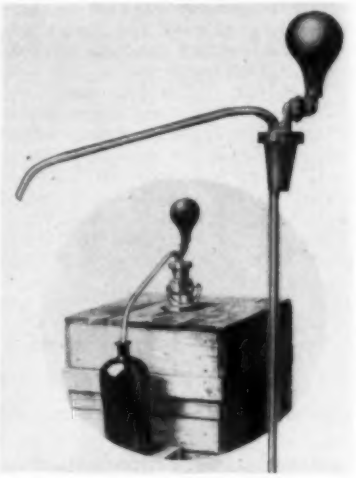
Conveyor Belts

A new plastic coating has been developed and tested by the Amercoat Division of the American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif., for use on rubber, rubber belting and cotton belting. This coating, Amercoat No. 40, combines the properties of synthetic rubber with the chemical resistance of Vinyl resins to produce a film of unusual toughness and flexibility, with excellent water resistance. Amercoat No. 40 will stand continuous flexing and has excellent adhesion to rubber, canvas, metal, concrete and wood—after the surface has been properly prepared. The coating is recommended for conveyors and other belting subject to abrasion, spillage of water, grease, oil and other chemical solutions and cleaning agents.

Safe Handling for Acids and Other Liquids

A safe method of handling acids is provided by a manually-operated acid pump, supplied by General Scientific Equipment Co., 27th & Huntington St., Philadelphia 32, Pa.

Corrosive and other liquids flow smoothly and stop instantly. They come in contact only with the corrosion-resistant tube and cannot affect other parts. When the pump is removed, the acid drains completely. No tilting of the container is necessary, and danger of a slip, a splash or a spill is minimized.



You can safely withdraw acids from a carboy with this G.S.E. hand pump.

General Scientific pneumatic acid pumps are supplied in hand or foot-operated models. Either can be equipped with a lead tube for sulphuric, hydrochloric, hydrofluoric and similar acids or with a Saran (flexible plastic) tube for nitric, phosphoric, acetic acids, peroxide and many other liquids. Special tube lengths can be supplied.

Low-Cost Resin Alcohol

Commercial production of a new low-cost resin alcohol made from rosin, which has potential application in a wide number of industries including textile, rubber, adhesive, detergent, paint, varnish, and lacquer, is anounced by Hercules Powder Co. The new product is called hydroabietyl alcohol. It is the first commercially available primary alcohol to be developed from rosin, one of the cheapest organic acids available.

of a "finishing engineer" eliminated a production headache before it developed!

Wealth of experience in every phase of finishing gives a Lowe Brothers "Finishing Engineer" the know-how it takes to solve problems—or to eliminate problems before they have a chance to develop. For example, the knowledge of a Lowe Brothers "Finishing Engineer" recently helped a manufacturer market a new product on schedule, and eliminated the loss of production hours, material, rejects and complaints. This was the result of foresight in conducting a check of planned finishing operations.

In the test run foreign matter appeared in the finish. The complete check resulted in two minor changes—a fan adjustment and a reduction in the time elapsing between the cleaning and finishing operations. The result was a perfect finish, free of foreign matter. A simple matter—yet the loss might have been serious without the on-the-spot service of the Lowe Brothers "Finishing Engineer."

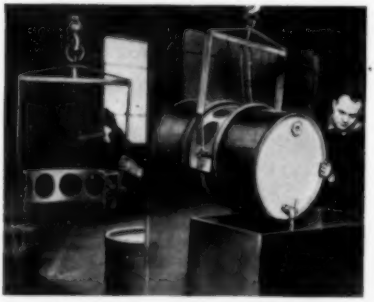
Manufacturers in practically every field have found the Lowe Brothers "Finishing Engineer" to be their best assurance of better finishing methods, and a way to better finishing results in their plant.

So, why not have a Lowe Brothers "Finishing Engineer"—on the spot when you need him—to apply his wide experience to *your* finishing methods and their possible improvement? You need not be a Lowe Brothers customer—and there is no cost or obligation. Just write to The Lowe Brothers Company, Dayton, O.

Lowe Brothers
FINISHES FOR INDUSTRY

Falstrom Drum-Karrier

The new Falstrom Drum-Karrier solves a real problem wherever drums of material are handled in the plant, on loading platforms or in outside yard operations. It is always ready



Drum carrier fits all standard size drums.

for service and can be quickly fitted to, or removed from, existing lifting devices. The Drum-Karrier is simply hooked on to the hoist, moved to position, cinched around drum, and transported where needed. Positive tilt locks hold the drum in vertical position and permit easy, controlled tilting to mix or dispense contents over receiving tank.

Four simple rapid operations permit one man to move and mount a drum of material and dispense all or part of its contents. It is a product of The Falstrom Co., Falstrom Court, Passaic, N. J.

"No-Rub Refinish"

The H. C. Sweet Co., 3729 Fenkell, Detroit 27, Mich., declares that its Sweetline No-Rub Refinish is a revolutionary new approach to cleaning and polishing. It eliminates separate cleaning and polishing operations by doing both jobs at the same time. It cleans, renews and protects surfaces, leaving a waterproof, alcohol-proof high gloss finish.

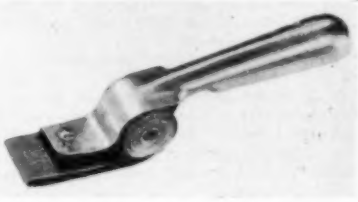
Sweetline No-Rub Refinish contains no injurious solvents; it is compounded of pure quick-drying oils. It is non-inflammable and has been used successfully on all sealed surfaces such as desks, counters, office and restaurant equipment, displays, bars, plastics, tile, metal and genuine and artificial leathers. It is equally effective on interior or exterior surfaces.

Makes Hand-Sanding and Scraping Easy

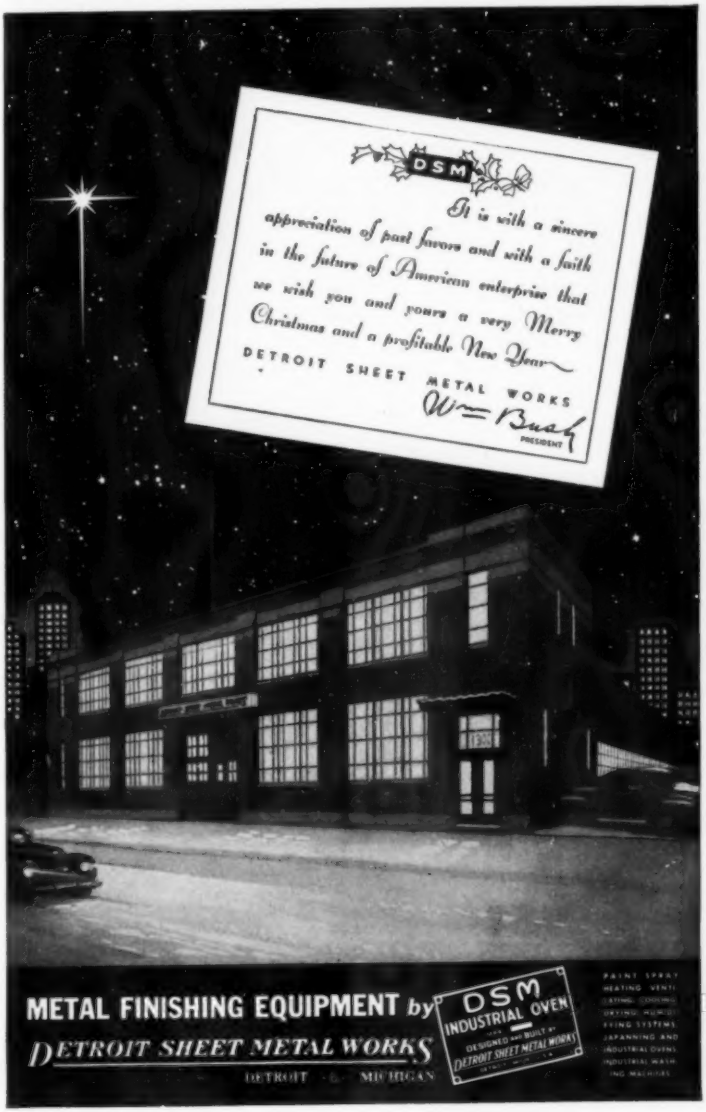
Designed to ease the task of hand-sanding and scraping operations, this new device, called the Matglo Sander-Scraper, enables finishers and cabinet workers to accomplish perfect sanding or scraping with least possible exertion.

The Matglo Sander-Scraper is equipped with a convenient handle so that sanding can be done by easy strokes, without the usual finger straining and tedious clutching of sandpaper. It does away with bruised knuckles and lacerated fingers.

The unit consists of a flat plate—felt covered—over which is stretched the sandpaper. Directly above and to the rear of the plate is a reserve roll of sandpaper. This is fed over the plate and is then folded up and on top, being securely locked into position by a setscrew. *(Continued on page 114)*



This metal handle is designed to hold narrow sandpaper or a scraper blade.


DSM
It is with a sincere appreciation of past favors and with a faith in the future of American enterprise that we wish you and yours a very Merry Christmas and a profitable New Year
DETROIT SHEET METAL WORKS
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PRESIDENT
METAL FINISHING EQUIPMENT by
DETROIT SHEET METAL WORKS
DETROIT MICHIGAN
DSM
INDUSTRIAL OVEN
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DETROIT SHEET METAL WORKS

When the sandpaper becomes worn, the setscrew releases it and the old sandpaper is torn off. A new surface may be quickly unrolled and brought over the plate for fresh work. Scraper blade is held in position by setscrew. Cutting edge of scraper clears paper. Position is easily changed for sanding.

The Matgo Sander-Scraper is manufactured by the Glober Mfg. Co., 5640 S. Lake Park Ave., Chicago, Ill.

Alodized Treatment for Aluminum

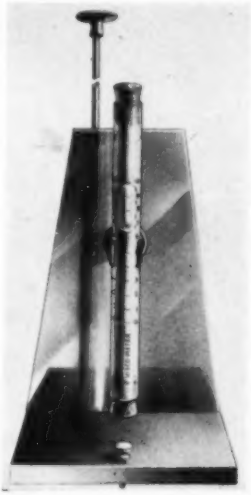
"Alodine" is a recent development of the laboratories of the American Chemical Paint Co. of Ambler, Penna. It provides a simple, rapid and economical means for protecting aluminum and conditioning it for painting.

Baths containing the chemical, "Alodine", actually alter the chemical nature of the aluminum surface, imparting high corrosion resistance to the metal and the paint bond of excellent adhesive qualities. This is obtained in an unbelieveably short time, and as a result, Alodized aluminum products achieve a dual result of durability and lasting beauty. Many comparative tests have proved the stability of Alodized aluminum under the most severe conditions—the corrosive atmospheres of salt mist and high humidity which combine to attack unprotected or poorly protected metal.

Gardner Visco-Meter

A simple instrument for measuring the viscosity of heavy oils and finishing materials is announced by Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md.

Referring to the accompanying picture, the measured glass tube is so mounted that it can be removed from its holder for filling, emptying and cleaning; when clamped into position it can be quickly inverted so the user can observe and time the rise of a bubble from bottom to top. A 4-page folder describes and further illustrates the instrument, and gives complete directions on how to use it.



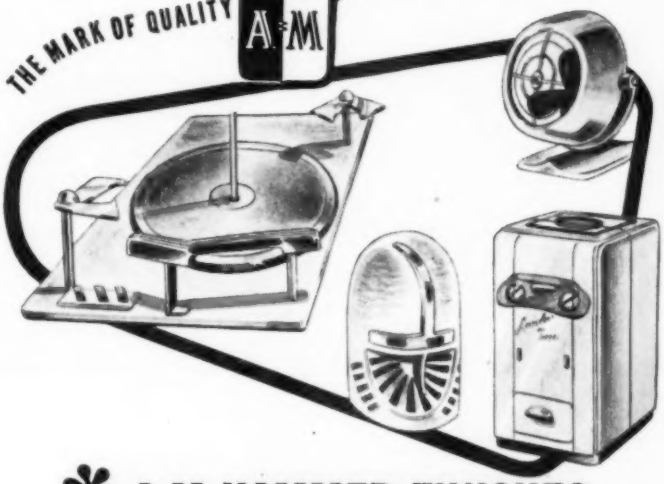
You measure viscosity of a liquid by timing the rise of the bubble in the smooth-bore, calibrated glass tube.

Acid-Resistant Bake Finish

A new finish to be used on ferrous and non-ferrous metals has been developed by Acryvin Corp. of America, Astoria, Long Island, N. Y. This new finish, named "Acraclad", has been thoroughly tested by the firm's own laboratories and in production runs, and is now available to industry.

Acraclad is a new one-step finish. No primer is necessary. The only step necessary before applying this finish is the usual pre-cleaning or degreasing. Coupled with this feature

THE MARK OF QUALITY A·M IN FINE PAINT FINISHES



A-M HAMMER FINISHES for DURABILITY-ECONOMY

With a beauty belieing their low cost of application, A-M Hammer Finishes are unexcelled whenever appearance, economy and durability are identically important. During the Hammer Finishing process, undersurface imperfections are obliterated to the extent that pre-painting preparation may be minimized. Just one coat . . . another saving . . . is required for ordinary surfaces to assume the appearance of fine hammered metal. On your product place the final MARK OF QUALITY . . . an A-M Hammer Finish.

A·M FINE FINISHES

American-Marietta Company

43 E. OHIO ST. CHICAGO 11, ILL.

A GREAT NAME IN PAINT MAKING

is the quick baking cycle, with a maximum of ten minutes at temperatures ranging from 250° F. to 350° F. Certain metal alloys will require a baking cycle of a maximum of 20 minutes at the same temperatures, but it will never be necessary to have a longer baking cycle than 20 minutes.

This is a non-toxic coating with extremely high corrosion resistance to acids, oils, alkalies, and salt spray. Application is by spray, brush, dip, or roller coat, giving a coverage of 350 to 450-sq.-ft. per gallon.

Acid Resistant Paint

Cheesman-Elliot Co., Inc., of 639 Kent Ave., Brooklyn, N. Y., is marketing radically new printing and finishing paints made with Resin "A", produced by the Standard Oil Co. of N.J.

These paints embody the unusual qualities of this extraordinary resin which is a by-product of the synthetic rubber research of the Standard Oil Co. of N. J. They possess remarkable adhesion to galvanized iron and other difficult surfaces, together with great alkali and acid resistance.

Long-Life Weather Protective Coating for Metal

A new "self-healing", spray coating material, designed for the long-term protection of storage vessels, bridges and many other metal structures exposed to the weather, has been introduced by The Arco Co. of Cleveland, Ohio and Los Angeles, Calif., manufacturer of industrial paints and a wide range of maintenance products.

The new "Dum Dum for Metal" has a tough but elastic and pliable coating that effectively "seals out" measurable vapor, moisture, chemical gases and fumes. It can be used with a minimum of surface preparation on new or uncoated structures, and also over previously coated surfaces, except those with bituminous-type coatings.

Because inner portions of the material heal themselves if the outer skin of the protective film is bruised or broken, the manufacturer states that "Dum Dum for Metal" can be expected to provide effective weather protection for ten years or more.

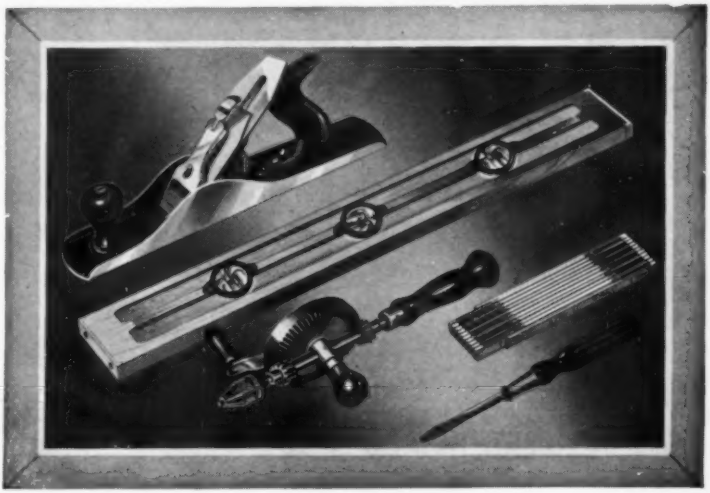
Why He Lost Gloss

ONE MANUFACTURER of novelty furniture had been using a pigment wiping stain for a number of years on popular and other soft, small-pore woods. Of course, he did not use filler. He obtained a nice finish.

One day he decided he would switch from a pigment stain to a non-grain-raising stain to obtain better clarity in his color—a very logical thing to do. After matching up the color, he finished a few pieces with the non-grain-raising stain, using the same sealer and lacquer topcoats, and following the same procedure as before. All of them were decidedly lacking in fullness and gloss.

When I was called in for advice I found it was necessary to raise the solids of the lacquer and increase the viscosity somewhat in order for him to get the same fullness as before. This was necessary because the pigment stain gave him better "hold-out."

All pigment stains have some filling properties, which are aided by the wiping process. Since non-grain-raising stain has no filling or sealing properties, it allows the topcoats to sink into the wood more, especially on the end grain. This difference in properties must always be considered in switching from one type of stain to the other.—ROLLIN H. WAMPLER.



"FINISHES"... *by Stanley*

What catches a craftsman's eye? Gleaming metal . . . keen edges . . . colorful handles with durable, glistening finishes?

All are important. That's why it was necessary to develop *special* finishes for the world's best-known line of hand tools . . . finishes that would withstand rough handling by greasy, gritty, sweaty palms. And Stanley specialists found the solution . . . again the "special finish for the special job", typical of the research for which Stanley is famous.

If you have a product, regardless of its material, requiring a finish with special characteristics, ask us about it. Stanley Chemical Company, East Berlin, Connecticut.

STANLEY

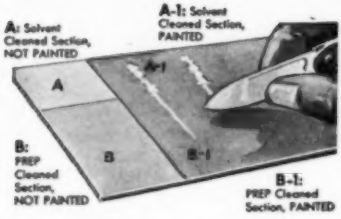
STANLEY CHEMICAL

INDUSTRIAL COATINGS

Lacquers Synthetics Japans Enamels

Make this ADHESION TEST with

PREP PRODUCTS



The merit of Prep Products has been proved conclusively by the above tests. Many laboratory technicians and paint superintendents have been sold on Prep Products after duplicating this test in their labs and on production. We urge that you also investigate the merit of Prep Products.

METALPREP for Steel Surfaces . . GALVAPREP for Galvanized Iron and other Zinc-coated Surfaces . . . ALUMIPREP for Aluminum Alloys . . . PREPRITE for Corrosion-resisting Phosphate Coatings.

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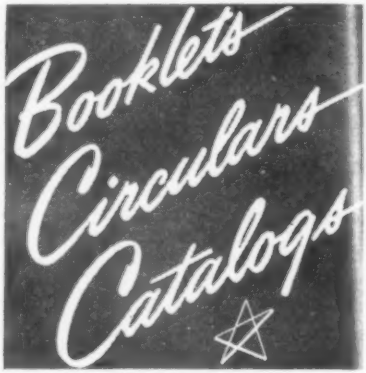


Laboratory Equipment Bulletin

If you are interested in new laboratory apparatus, send for the Eberbach "Announcer of Scientific Equipment" just off the press. Write to Eberbach & Son Co., Ann Arbor, Mich.

Belt Conveyor Bulletin

If you have any use for or interest in belt conveyors, including supports, drive and accessories for same, send for the new 4-page folder offered free by Coburn-Foster Conveyor Co., Inc., 9362 Ewing Ave., Chicago 17, Ill.

Protective Coating Catalog

A 12-page catalog giving complete details on the chemical and physical properties, application instructions and other pertinent data on protective coatings is now available upon inquiry to the Amercoat Division, American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif.

Baskets, Trays, Fixtures for Work in Process

Catalog No. 16 has just been released by Stanwood Corp., 4819 W. Cortland St., Chicago 39, Ill., specialists in the design and manufacture of containers and work holders for handling parts through degreasing, rust-proofing baths and other processing.

The catalog shows how the requisites of baskets, trays and fixtures, are em-

☆ *First in Quality* ☆ *First in Service*

Season's Greetings

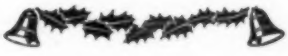
to all our friends in the trade.

May you have

A Very Merry Christmas

and a

Happy and Prosperous New Year



The Gilbert Spruance Company

Richmond and Tioga Streets *Philadelphia 34, Penna.*

SEND $1.25 FOR ONE MARTINDALE PROTECTIVE MASK and 50 No. 1 Refills

or $1.50 if you prefer No. 2 Refills

Weigh Less Than ½ oz.

PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Not Recommended for Toxic Dusts or Free Silica

Protect your nose and throat from dust, powder and spray from non-toxic enamels and paints. Dust may carry dangerous germs.

List Prices—F.O.B. Cleveland

Masks ..... $0.25 each
No. 1 Refills (std. weight) ..... .02 each
No. 2 Refills (heavyweight) ..... .02½ each

Masks packed in individual envelopes. Refills packed in envelopes of 25.

The No. 2 Refills contain twice as much filtering cotton as the No. 1.

Write for Bulletin 352 showing quantity discounts on orders of $5.00 and over

If payment accompanies order we will pay parcel post or express charges. Minimum order for C.O.D. or charge account $2.00.

Martindale Electric Co.
1353 HIRD AVE. CLEVELAND 7, O.

bodied in Stanwood fabricated metal products; use of the metals with maximum resistance to the heat or other destructive forces encountered; correct design for efficient, time-saving operation; rugged construction for severe service. Where weight savings are desired, light weight has been obtained without sacrifice of strength.

Miskella Infra-Red Ovens

A new circular from The Miskella Infra Red Co., E. 73rd & Grand Ave., Cleveland 4, Ohio, illustrates and describes several of the company's products, which can be assembled or arranged to provide units or ovens for quickly drying work in process, baking finish coatings, etc. The new insulated "super heat" oven is especially featured in this folder.

Synthetic Resins Booklet

A new technical booklet which, for the first time, includes a description of the properties and uses of all Hercules Powder Co. synethetic resins is now available.

Hercules synthetic resins, most of which are rosin-base, have found application in a wide number of industries including protective coatings and adhesives. Copies are available at Hercules Powder Co., Wilmington, Dela.

Chemical Products Book

Publication of a new edition of "Chemicals By Glyco", a 92-page book which lists and describes organic chemical compounds made by the Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N.Y., is announced by Harry Bennett, president. The chemical firm, which has plants in Brooklyn, N. Y. and Natrium, W. Va., manufactures an extensive line of chemical products for a wide variety of industrial uses. Besides listing and describing the complete line of Glyco chemicals, the new edition gives formulas for basic uses of the chemicals.

Floor Finishing Selector

"Johnson's 3-Step Floor Finishing Selector," a compact slide-rule guide for all who are concerned with proper floor finishing and maintenance, is now being offered free by makers of Johnson's wax.

By means of a slide and window arrangement, the essential steps in finishing any type of flooring appear in proper sequence as the slide is moved up or down. The user selects the type of floor to be finished, moves the slide through the

IF YOUR PRODUCT NEEDS

exterior durability

YOU NEED

A *Watson-Standard* FINISH

Whether your product is made of wood, metal, paper, foil or plastic—there's a Watson-Standard coating to meet your requirements of exterior durability. In addition to the large number of Watson-Standard coatings already formulated and available, our research laboratories are ready to create to your specifications a coating that is prescription made for your product. We'll be glad to discuss your needs in detail.

THE WATSON-STANDARD CO.

Manufacturers of
PAINTS • VARNISHES • INDUSTRIAL FINISHES AND LITHOGRAPH COATINGS

FACTORY AND GENERAL OFFICES: PITTSBURGH, PA. • WAREHOUSES: BOSTON, BUFFALO, DETROIT, NEW YORK

Rx *Prescription Finishes*

SAFEGUARD YOUR SPRAY BOOTHS

Layers of inflammable paint come off more quickly if you have applied Wyandotte Spray Booth Coating first. Only a thin coating makes cleaning easier, speedier, more economical.

And you can reduce your floor-cleaning costs with Wyandotte F-100*. Even heavy soil stands no chance against this remarkable compound.

For more information about these Wyandotte Products, write the Wyandotte Chemicals Corporation, Wyandotte, Michigan.

*Registered trade-mark

EVERYTHING
FOR INDUSTRIAL FINISHERS

• LACQUERS • ENAMELS
• SCREEN PROCESS
• BLEACHES • STAINS
• SPRAY EQUIPMENT

SAME DAY SERVICE

MORRIS
Paint & Varnish Co.

1823 Washington St. Louis 3, Mo.
1510 Capitol Omaha 2, Nebr.

three simple steps, and the proper finishing materials, application methods, and "reasons why" appear in the right hand horizontal window.

These Johnson Floor Finishing Selectors can be obtained from any distributor of Johnson's maintenance products, or by writing to S. C. Johnson & Son, Inc., Racine, Wisc.

Infra-Red Ovens; Conveyors

Twenty pages filled with pictures and brief notes of oven and conveyor installations in all kinds of factories that use this equipment in their finishing operations, are contained in a new 8½x11-in. bulletin published by Jensen Specialties, Inc., 9331 Freeland, Detroit 28, Mich. The cuts from actual photographs of work in process really give the reader many new ideas and valuable suggestions. Copy of the bulletin is free.

Osborn Brush Catalog

A new three-color brushing catalog, designed to simplify selection of the best brush for the individual job, has just been issued by The Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio. The new catalog contains 76 pages and cover, is 8½x11-in. and presents numerous illustrations of industrial brushing operations, in addition to photographs and a description of Osborn's complete line of power, paint, varnish and maintenance brushes.

Fire Picture in Color Free

A new technicolor motion picture "Fire and How to Fight It" has been produced by Walter Kidde & Co., Inc., Belleville, N. J. The picture shows how various types of portable extinguishers can be used effectively against incipient fires, and is especially recommended for any industrial concern which is planning a fire brigade training program.

The film is 16-mm. with sound track, has a running time of 23 minutes and can be obtained from Kidde Co.

Small Carbon Dioxide Fire Extinguishers

A new catalog section on its line of hand carbon dioxide fire extinguishers, for use both in industry and the home, has been published by The B. F. Goodrich Co., Akron, Ohio. Copies are available upon request.

Made in four sizes, with the carbon dioxide charges 2 3/8, 4, 10 and 15-lbs., the catalog section describes construction of the extinguishers and gives specifications, including total weight and type of nozzle connection.

Remember Pearl Essence for

A Decorative Finish

MEARLMAID Pearl Essence is being used on hundreds of different products to produce a decorative and attractive effect.

Investigate the numerous advantages of a Mearlmaid Finish before you select the final coating. Its sales appeal and merchandising value are important.

THE MEARL CORPORATION

153 WAVERLY PLACE NEW YORK, N. Y.

Factories

ROSELLE, N. J. EASTPORT, ME.

Has High Reflective Light Value

For Dials Controls Instruments

"WORLD'S LARGEST PRODUCER OF PEARL ESSENCE"

Industrial FINISHING Editorial

New Coating Setup in Unused Engine Room

A certain mid-western plant, which had been operating about 50 years, acquired some new blood in the organization—and with it several new products which required dip finishing and baking. The products were such that a good baked finish was all that was required. (The surfaces didn't show in regular service).

The firm had never done any dip finishing before, so the problem confronting management was where to locate the finishing room. An executive of the company called in a firm of finishing engineers to look over the situation. One of the engineers discovered an unused engine room and coal bin—a space 12-ft. wide by 80-ft. long, with a concrete floor and solid brick walls 13-in. thick.

This, it was decided, would make an ideal dip-coating room. Accordingly, the roof was changed to bring in light, windows were cut in the outside wall, and the interior was painted. An overhead chain conveyor was put in to bring parts from fabrication far above floor level. By conveyor the parts pass through an elevated infra-red tunnel for degreasing, then travel on two levels to cool, then through a dip tank, over a drain, through another infra-red tunnel to bake the enamel, and out to assembly—all on the same conveyor and all in the old engine room.

The whole dip-coating and oven drying setup was made possible by correct engineering and applying proper methods. However, these things could never have been done without using modern improved equipment.

Right Inspection Can Stop Complaints

Every manufacturing concern would like to keep down to a minimum the number of complaints received from its customers. Each complaint indicates a dissatisfied customer. This dissatisfaction may be only temporary, provided the replacement is prompt and does not have the same fault. But the thought that an inferior product was sold remains in the customer's mind and has an influence on his future purchases.

Any steps that can be taken to minimize complaints, add up to increased sales for the manufacturer. Besides, every complaint means that extra time, labor, and materials are necessary to correct the faulty product manufactured. With the arrival of a buyer's market, complaints can no longer be ignored. They must be considered seriously and handled tactfully.

The furniture industry, because of many operations involved in manufacturing, is particularly vulnerable to complaints. Each step in produc-

★ ★ ★ **INDUSTRIAL FINISHING wishes all of you readers a Merry Christmas and a very Happy Prosperous New Year**

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SEALERS
ENAMELS
UNDERCOATS
STAINS • GLAZES
SHELLAC
NOVELTY FINISHES

•

IN STEP WITH THE TIMES

Industrial Finishes

that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

JAMES B. DAY & CO., CHICAGO

USE
Crystal
TACK RAG
BEFORE YOU SPRAY
Industrial size 18 x 36
WILL NOT SMOKE NOR GENERATE HEAT WHEN STORED IN A WARM PLACE
Always Soft and Tacky

Speed Up Your FINISHING PRODUCTION LINE with this Soft Tacky Cloth
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TACKY WIPERS
Available in GROSS LOTS thru PAINT DEALERS or from the Processors

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"Sales Appeal"
STARTS WITH A
beautiful
WOOD-GRAIN
finish

American Graining Plates are photographic reproductions of fine woods.

AMERICAN RICHWOOD PRODUCTS CO.
Graining Plate Division
104 E. Mason St., Milwaukee 2, Wis.

tion offers a chance for something to "get by" that will result in an inferior piece of furniture. Aside from the style of the furniture and the quality and figure of the wood itself, the most important feature of furniture is the finishes applied and their methods of application.

A rigid inspection system should prevent any articles that show slighted workmanship or faulty material from being passed into the finishing room, or moving from one station to the next in the finishing room. This precaution is important to prevent the wasting of subsequent labor and material. For example, if a mahogany filler does not completely cover the surface or if the excess filler is not entirely removed by wiping, and if an inspector does not catch this fault, the sealer and all following coats, if applied, will have to be removed when this fault is caught in final inspection.

The labor involved in sanding, coating, drying and rubbing this article, on which some work is slighted, will be wasted and will have to be repeated on the replacement. More than that, if final inspection does not reject this article, a complaint will subsequently be registered with the sales department. An efficient inspection can do much to reduce complaints. If inspection is made at key points it will pay for itself in the time, materials, and labor saved in refinishing so much faulty work.—H. H. WATJEN.

Motion Pictures Train Workers

Motion pictures, used by industry to train employees in new and effective technical operations and processes, are recognized as significant factors in engineering advancement by the American Society of Tool Engineers.

Five industrial training films, all produced by The Jam Handy Organization and featured at the Society's Boston meeting, illustrate the variety of motion picture techniques adaptable to specialized production methods.

FOR ASSURED SATISFACTION — GET ORIGINAL AND GENUINE

LIQUID ENVELOPE

PEELABLE PROTECTIVE PLASTIC FILM

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Spray it on

Peel it off

A CLEAN BOOTH IN MINUTES!

Product of America's longest and broadest experience in making *peelable* plastic films. Now used by hundreds of important plants. Quick-drying. Not a soap or emulsion. Does not rely on overspray to form a film. Peels easily no matter how heavy or light the overspray at any point in booth. White color improves booth illumination. Film non-combustible.

TEST-SAMPLE OFFER

5 gallon can, shipped prepaid on a money-back guarantee $17.50, complete with instructions and attractive low prices on quantity re-orders.

Many cheap imitations of genuine "LIQUID ENVELOPE" are being rushed onto the market by inexperienced producers. For assured satisfaction, be sure to get the original and genuine "LIQUID ENVELOPE" made only by

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The **DUST-ALL**
TACK RAG
Collects Dust and Dirt Too!

DUST settles on surfaces and unsatisfactory finishes result. The *Dust-All* Tack Rag collects Dust. It is the quick economical means to assure good finishes.

Get the *Dust-All* Tack Rag in the Red Checkered Bag at your Dealers or write us.

HARDING
MANUFACTURING CO.
10606 Gratiot Ave., Detroit 13, Mich.

Two Types of Water Wash Spray Booths

★ The use of water wash spray booths is both desirable and advantageous. Desirable because they afford the utmost in cleanliness in and around the booth, with no deposit of lacquer, enamel, or varnish on fan blades, in exhaust stack, or on outside of buildings or roof. Advantageous because, by reason of this cleanliness, the fire hazard is reduced to a minimum.

There are two distinct types of water wash spray booths. For lighter materials such as sealer, lacquer, varnish, enamel, etc., the booth is equipped with a tank and pump which recirculates treated water, causing it to flow down the back of the booth, thereby forming a curtain of water. This is accomplished by pumping water through a header, then through small nozzles against a series of baffles. The exhaust fans draw material laden air through the water flowing down the baffles. The water separates the material from the air as it passes through, allowing only clean filtered air to pass through the fan and out of the stack. The material temporarily suspended in the water settles to the bottom of the tank as sludge which is periodically cleaned out either for salvage or disposal.

The other type of water wash spray booth is intended for use in booths where heavy material such as filler, or any material having abrasive qualities is being sprayed. The principal of removing material from the air is the same in the two types of booth, but the second type has no pump nor

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★ *Guest Editorial . . . Many readers can write an excellent editorial—two or three paragraphs that present a timely suggestion or valuable idea which will stimulate thought on a live subject. The Editor welcomes guest editorials, paying for those published.*

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DUPOR No. 4

The ideal respirator to keep sawdust out of nose—throat—lungs—! Thick felt filters guard against grinding dusts, silica dusts, etc! Rubber face mask provides air-tight fit on any shape face. Price $19.80 doz.

COVER'S GAS-TIGHT FOG-PROOF GOGGLES $1.65

Sample $1.65

H. S. COVER
South Bend, Ind.

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FASHION CRISTALITE
LACQUERS and SEALERS

Are especially formulated for the light blonde or bleached finishes. They are "water white" and do not impart any color to the surface.

They have high solids content and produce excellent body. They will not mar or scratch readily and can be sanded in one hour.

Mac's Cristalite Lacquers are available in various sheens.

Write for samples and descriptive folder.

The Lawrence-McFadden Co.

Headquarters for Fine Finishes Since 1875

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This PROTECTIVE FINISH passes every SEVERE TEST with Flying Colors!

Strathmore METALBOND clear

for Spray or Dip Application

RESISTANCE to MOISTURE
Even withstands extended immersion. Extremely resistant to alkali, dilute acids, soaps, solvents, etc.

TEMPERATURE CHANGES
Successfully used on interior & exteriors of nationally-known Quick Freezers, Milk Coolers . . . hundreds of other items.

ADHESION to really "TOUGH" METALS
Air dries in 15 minutes—Force drying achieves maximum resistance more quickly. Unmatched adhesion to lead, brass, copper, aluminum, zinc, galvanize, magnesium. Mixes with aluminum bronze for a beautiful silver finish.

Order 5 Gal. TODAY at the DRUM PRICE

Prove to yourself, on your own metals, that METALBOND delivers greater adaptability, 100% satisfaction at lower cost. Write or wire . . .

STRATHMORE PRODUCTS

Strathmore PRODUCTS INC.
1970 W. Fayette St.
Syracuse 4, New York

moving parts. The water curtain in this booth is horizontal (in the other type it is vertical) located at the bottom of the booth. Powerful exhaust fans mounted on top of the booth draw air through the horizontal water curtain into a sinuous passage formed by baffles at the rear of the booth. Suction created by the exhaust fans lifts the water up in the passage over a baffle. Clean, filtered air continues up the passage and out the stack, the water circulates back into the tank, flowing from the rear of the tank to the front to pick up material being sprayed and the cycle continues. Exhaust fans of sufficient capacity to maintain a minimum air velocity of 150-ft. per minute over the front area of the booth are necessary for proper operation. The advantage in this particular type of booth lies in the fact that it has no moving parts which would require frequent renewal if heavy, abrasive materials were used.

Both types of water wash spray booths are very effective, safe, and afford cleanliness inside and outside the plant that is impossible with any type of dry booth.—J.R.

Want to Know Why?

★ I closed the door marked "Plant Manager." It was locked for the night. My son Bill was waiting in the car to drive me home. As we left, I asked him to drive over past Henry Ex's (short for Exeter) house. Henry operated the degreaser, and had been on the sick list for about a week.

Jenny his wife answered my knock and invited me in to see Henry. He was better; said he had thought of coming in that morning, but later decided to wait a couple of days. I told him how we were all fighting to increase production, and that every employee was really needed. He read-

ily agreed and declared that he would be well enough to be on the job next morning.

As we left, I asked Bill to stop by Joe Musatti's house. Joe was spray operator and a good one. Joe had laid off for the past four Mondays and I wanted to find out why. I felt pretty sure it was not because of too big week-ends, for there was Angela, his wife, and their four children. After talking it over with Joe I found out the answer. He was staying home on Monday to help Angela with the big family wash.

Angela was expecting a fifth offspring. She needed an automatic washing machine. The local agency had made promises of delivery but everything was scarce and shipments were delayed. I agreed to see what could be done next day toward getting that washing machine.

Joe and Angela invited me to stay for supper. I told Bill to drive on home; that I would walk over later. It was a good meal, even though somewhat noisy with the four little Ms. As I walked home just about dark, I made up my mind on two scores. I would see that Angela got that washing machine somehow, and I would send her a box of candy in appreciation of a nice supper.

We have nearly a thousand employees. Naturally I cannot visit all of them, but there is the superintendent, and job foremen, and we work together on the job of looking after the interests of our employees and our company.

Several weeks later I attended an association luncheon. A man asked me, "How is the labor situation in your plant?" I told him that I considered it very good indeed. Now that may or may not sound strange in these times, but these people who work in our plant are our friends. We know them by their first names, we know their Jennys and Angelas, how many kids they have and a

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Complete protection for eyes and face against light flying particles are yours with durable easy-to-wear M. S. A. Faceshields. Efficiently designed; built of highest quality materials; available in three headgear type and three visor lengths of various shades and thicknesses. Write today for Bulletin CN-1.

*Headline Design fits natural head contours — no pressure points! Lightweight assembly supported by center strap across head—greater comfort and greater protection!

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5 Gallon BLUE BOY Model

PAINT REJUVENATOR

Restores Paints, Lacquers, Enamel Products and Pigment Primers, to original consistency in 3 to 10 minutes without opening the can. Available for Round or Square 5-gallon cans. Explosion proof electrical equipment if desired. Also other units from ½-pint to 50-gallon drum capacity available. Originators of Paint Rejuvenating Equipment—ten years—thousands of satisfied users.

Miracle Paint Rejuvenator Co.
127 E. 7TH STREET ST. PAUL, MINN.

great many of their problems. We help them and when we need production they help us. No we don't have any labor problems, thank you.—P.M.

Utility Value of Furniture Finishes

★ It is an axiom of the furniture industry that it is the appearance of a suite of furniture that sells it. The design must be right, the finish must be good. For certain types of furniture, soft, rich colors and low color contrasts are desired, together with a dull, velvety sheen. Other types require bright, light colors, high color contrasts, and very high gloss. The particular color and degree of gloss must be appropriate to the design and fit in with the tastes of the particular class of buyers the manufacturer is trying to attract.

It cannot be denied that appearance is one of the most important points to consider in a furniture finishing system. But in centering attention on appearance the utility value of the finish is often overlooked. Besides having a good appearance, the finish must wear well, have good resistance to temperature and humidity changes, water, alcohol, hot dishes, scratching, marring, and abrasive action.

Perhaps here is an opportunity for the furniture manufacturer to increase his sales by emphasizing not only the appearance of his furniture, but also the resistance and wearing qualities of the finish. He could supply his dealers with small sample panels representing his finish, and with simple tools and instructions permit the dealer to demonstrate to his customers the superior wearing qualities. Certainly the ultimate furniture buyer is interested in whether the finish will retain its good appearance over the years.—R.H.W.